JPRS-UAC-87-002
16 SEPTEMBER 1987

FOREIGN BROADCAST INFORMATION SERVICE

JPRS Report

Soviet Union

AVIATION & COSMONAUTICS

No 2, FEBRUARY 1987

JPRS-UAC-87-002

16 SEPTEMBER 1987

SOVIET UNION

AVIATION & COSMONAUTICS

No 2, February 1987

[Except where indicated otherwise in the table of contents the following is a complete translation of the Russian-language monthly journal AVIATSIYA I KOSMONAVTIKA published in Moscow.]

CONTENTS

AIR FORCE CIC URGES FULL IMPLEMENTATION OF PERESTROYKA

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 87 (signed to press 4 Jan 87) pp 1-4

[Article by twice Hero of the Soviet Union Mar Avn A. Yefimov, commander in chief of Air Forces and USSR deputy minister of defense: "An Army Born in the October Revolution"]

[Text] 23 February is a special date in the history of our socialist homeland. Sixty-nine years ago on this date an army of a new type was created, a military organization of liberated workers and peasants, an instrument of defense of their revolutionary achievements. The Soviet Armed Forces are continuing today to carry out their lofty historic mission, by their military labor implementing the decisions of the 27th CPSU Congress. Under the guidance of the Communist Party they are vigilantly guarding the achievements of socialism and world peace. They also play a great role in ensuring the security of the entire socialist community. Inalterably enjoying a great deal of love and support by the people, they contain personnel well trained for combat, armed with advanced Marxist-Leninist theory, and possess experienced command and political cadres, capable of successfully carrying out tasks of various scale.

The birth, development and continuous improvement of the Soviet Armed Forces are inseparably linked with concern for them by V. I. Lenin and the Communist Party. A program of proletarian revolution, a teaching on armed defense of the world's first worker and peasant state, and the basic principles of building a military organization of a victorious proletariat were devised and scientifically substantiated under the guidance of and with the active participation of Vladimir Ilich. Our great leader directly supervised creation of the Red Army, clearly defined its missions and ways to achieve further increase in combat efficiency, and substantiated the directions to take in the forming of Soviet military science.

V. I. Lenin concretized the ideas of K. Marx and F. Engels on the essence and content of wars, their dependence on politics and economics, and provided an answer to many other military issues brought forth by the practical realities of the struggle of the worker class and all working people against imperialism. V. I. Lenin's scientifically substantiated conclusions on the objective necessity of armed defense of the state of dictatorship of the

proletariat against military onslaught by the capitalist countries proceeded from an important discovery he had made -- on the possibility of rupturing the chain of world imperialism at its weakest link and of victory by socialism initially in one or several countries. "This should," noted V. I. Lenin, "cause not only frictions but an outright attempt by the bourgeoisie of other countries to crush the victorious proletariat of the socialist state. In these instances war on our part would be legitimate and just. It would be war for socialism, for liberation of other peoples from the bourgeoisie."

Skillfully utilizing theory of scientific communism and the wealth of experience of revolutionary creative achievement of the masses, V. I. Lenin elaborated the sociopolitical and organizational principles of a military system of the Soviet State. His teaching on the defense of the socialist homeland became a component part of the Lenin plan for building the new society of the victorious proletariat. It formed the basis of our party's multifaceted activities in the area of organization of national defense, military organizational development, leadership and direction of the Armed Forces.

As V. I. Lenin foresaw, from the very first days of its existence the Land of Soviets found itself faced with the urgent necessity of defending itself, of defending its freedom and independence against numerous external and domestic foes in savage battles. Imperialism utilized all means at its disposal to strangle the world's first socialist state, to prevent it from rising firmly to its feet and continuing its development. The forces of world and domestic reaction knew what influence would be exerted by the great feat accomplished by the Russian proletariat, and for that reason they sought to settle accounts with the homeland of the October Revolution as quickly as possible.

Organizing national defense under incredibly difficult conditions, the party constantly bore in mind the experience of our people's struggle against the class adversary during the October Revolution and the Civil War.

With his inherent genius, V. I. Lenin skillfully revealed the sources and pointed out a practicable way to strengthen the defense capability of the Soviet State. Back at the threshold of the October Revolution he stressed that only bringing an end to the domination of capital, nationalization of banks and factories, transfer of land to the peasants, a decisive break with imperialism in domestic and foreign policy, overthrow of the bourgeois government and establishment of a dictatorship of the proletariat could make our country capable of defense. This was a revolutionary path of root economic and social reforms, transformation of an imperialist war into a civil war, putting an end to rule by the capitalists and transfer of power to the soviets of worker, peasant, and soldier deputies.

The military organization of the young socialist state was created in an extraordinarily complex situation. The intervention by imperialism and the Civil War imposed upon the Soviet people immediately assumed a threatening magnitude. Prompt, efficient resolution of problems connected with organizational development of the Soviet Armed Forces was needed. Under these conditions the Communist Party and V. I. Lenin reached the conclusion that it

was necessary to create a mass, well-organized and combat-efficient regular army.

For three years the Soviet Republic was engulfed by the flames of civil war. These were harsh years of development and strengthening of the young worker and peasant state and its Red Army. The Soviet nation had to mobilize all material resources and all the revolutionary energy of the people in order to fight off our numerous enemies.

The Communist Party and V. I. Lenin guided the heroic struggle of the Red Army on the battlefronts. Our country, transformed into a unified military camp, firmly implemented a policy in the interests of defense of the revolution. Vigorous measures were taken to strengthen command and political cadres and to engage in an aggressive underground partisan struggle in areas captured by the enemy. Analyzing the current situation and Red Army operations, the party Central Committee and V. I. Lenin took emergency steps pertaining to further mobilization and forming military units, establishing regular reserves, reorganizing supply, and restructuring command and control at the front and army echelons. Work directed toward strengthening army and navy party organizations, including in military aviation, experienced further development. They gained increased respect, authority and influence among the troops.

The 8th Congress of the RCP(b) [Russian Communist Party (of Bolsheviks)], which was held soon thereafter, adopted the second Party Program, drawn up under the guildance of V. I. Lenin. It provided a clear picture of the future struggle to build a socialist society in our country. An enormous role in uniting the working people for the struggle against external and domestic foes and in strengthening Soviet rule was played by a policy, devised by the Leninist Party and confirmed by practical experience, which called for a strong alliance between the worker class and the middle peasantry, with support from the poor peasants, and with the worker class playing a leadership role. The congress approved a Leninist policy of military organizational development directed toward organizing a class, regular army with centralized command and control and strong discipline. Lenin's ideas on organizational development of the army on a rigorously centralized basis were of particularly crucial, fundamental importance in those historical conditions.

"We were undertaking something," commented V. I. Lenin, "which nobody in the world had ever undertaken on such a scale.... We were proceeding on the basis of trial and error, endeavoring to create a volunteer army, feeling our way along, probing and testing to see how the task could be accomplished in the given circumstances. And the task was quite clear. We could not exist without armed defense of the socialist republic. The ruling class would never yield its power to the oppressed class. But the latter had to prove through practical deeds that it not only was capable of overthrowing the exploiters but also of organizing for self-defense and of making a total commitment."

The victories won by the Red Army on the battlefronts of the Civil War and later of the Great Patriotic War as well were first and foremost victories of the great ideas of socialist revolution, a victory by the forces of progress and peace over the forces of imperialist reaction.

One of the reasons for considerable successes in organization for defense and creation of an army of the world's first socialist state is that our party was able successfully to implement Lenin's theses on military organizational development, thoroughly to reveal and substantiate the most important principles of organization of the Soviet Armed Forces, training and indoctrination of personnel. These principles, tested and refined in the flame of savage battles, took on the force of military doctrine of the proletarian state. Following this doctrine, the Soviet Armed Forces are honorably carrying out their sacred duty to the people, vigilantly guarding the great achievements of the October Revolution.

The enduring significance of the Leninist principles of organizational development of our Armed Forces lies in the fact that they represent conclusions from the synthesized military-historical experience of revolutionary struggle by the working people against the exploiters, the experience of proletarian revolutions and civil wars, the practical business of building socialism, and proceed from the objective laws of societal development and the laws governing warfare. The profound understanding by our military cadres of the content of these principles helps them correctly get their bearings in the military-political situation, helps them find the correct ways to resolve the complex problems of military organizational development in peacetime and resolve them correctly in a combat situation.

It is also to the highest credit of the CPSU in organizing defense of our socialist homeland and increasing the combat might of the Soviet Armed Forces that even in the most difficult situation the party has always found and defined the most expedient structure, flexible forms and methods of political and military guidance and direction of the Armed Forces.

The entire history of the Soviet State and its world-historic victories gained in battles with the enemies of socialism, vividly and persuasively demonstrated the vitality of the principle of Communist Party guidance of the Armed Forces. It remains unshakable today as well.

The new, revised CPSU Program reads: "Communist Party guidance of military organizational development and the Armed Forces is the basic foundation of strengthening defense of the socialsit homeland. Policy in the area of national defense and security as well as Soviet military doctrine, which is of a purely defensive nature and is directed toward defense against attack from an external quarter, is drawn up and implemented with the party playing a leadership role.

"The CPSU will make every effort to ensure that the USSR Armed Forces are at a level whereby there is no possibility of strategic superiority by the forces of imperialism, ensuring that the defense capability of the Soviet State improves in a comprehensive manner and that the combat alliance of the armies of the brother socialist countries grows stronger."

This principle demands that military cadres unswervingly implement the policy of the CPSU and Soviet Government and always proceed from the interests of the people and defense of the socialist homeland.

The organizing and guiding role of the Communist Party in strengthening our national defense capability is manifested in unity of political, economic and military leadership, which is dictated by the very nature of the socialist society, the conscious and purposeful character of its organizational development, carried out on a foundation of knowledge and utilization of the objective laws of societal development. Strict coordination of the activities of the party, governmental, and military mechanism, with the Communist Party playing a guiding and directing role, has made it possible at all stages in the history of the Soviet nation to handle the affairs of state in a purposeful and efficient manner and to concentrate our country's political, economic, and military efforts on resolving pressing problems pertaining to defense of the socialist homeland and creating exceptionally combat-efficient Armed Forces.

The practicability of incorporating a unity of political, economic and military leadership is ensured by the entire system of socialist societal relations and by the Soviet system of government.

Successful leadership and guidance of military organizational development presupposes constant reliance on the solid foundation of Marxist-Leninist science. Unswerving adherence to the Leninist thesis on scientific character of leadership in military organizational development became one of the most important preconditions for victories by the Soviet Armed Forces over the enemies of the socialist homeland.

This conclusion is of paramount significance in present-day conditions as well. It focuses military cadres on profound study of military affairs, the laws and mechanisms of war, and on mastery of the art of command and control of forces. Scientific character in resolving the problems of military organizational development demands that commanders, staffs, and political agencies comprehensively and objectively analyze facts which affect the effectiveness of combat and political training of troops and that in the process of decision-making they thoroughly and comprehensively evaluate all situation elements and skillfully bring to light the political, military-technical and moral-psychological capabilities of friendly troops as well as hostile forces.

Scientific character in military affairs is manifested in a unity of theory and practice, in the ability of the Air Force commander, for example, to seek out and find all possibilities for increasing the combat readiness of the regiment and combined unit, in the process of accomplishing the assigned mission to find an optimal variant of combat operations with the least expenditure of resources. Initiative, foresight and innovativeness in the activities of command cadres, as well as broad operational-tactical knowledgeability are important. The ability correctly to choose the most effective forms and modes of military actions in a specific situation and, if the situation demands, to display boldness and determination and to assume responsibility for high-quality accomplishment of an assigned mission are qualities which should distinguish our commanders and political workers.

It is more important today than ever before to ensure that the commander who makes a combat sortie decision is prepared comprehensively and thoroughly to analyze the conditions in which his men will be operating, and on this foundation is able not only correctly to organize execution of the assigned mission but also to foresee possible actions by the adversary and to think out his countermeasures in advance. An important role is played by skilled utilization of historical experience and scientific and technological advances in military affairs. Our vanguard commanders, staff officers, political workers, engineers, aviation rear services and communications specialist personnel, such as party member officers V. Volomatov, V. Gusev, V. Grechanik, N. Dudarevich, N. Ivanyuk, V. Kurdas, A. Pavlov, V. Filchakov, and others proceed today precisely in this manner. They are aware that the more complex content of combat operations in modern warfare, broadening of their spatial scale, a sharply increased volume of missions, and enhancement of the role and responsibility of the personnel involved in them have led to tougher demands on intensity of air activities brought to bear on the adversary. In short, the degree of intensity with which every aircrew must fight is increasing greatly. Combat sorties can follow one after the other, day and night, in all weather. For this reason there has been a substantial increase in the degree of responsibility of aircrews for the results and effectiveness of combat flying and for maximum realization of the potential contained in modern aircraft systems.

At the same time combat leadership and battle management are inconceivable without the ability to see and take into account the phenomena of combat training activities as they actually are, in their entire complexity and mutual interlinkage, intensity and dynamic nature. But in each individual instance, in solving military problems it is extremely important to approach things, as V. I. Lenin taught, "from the standpoint of the factors of war and class relations...."

Unanimously supporting a course of policy aimed at acceleration and restructuring, as formulated by the April (1985) CPSU Central Committee Plenum and 27th CPSU Congress, our commanders, political agencies, headquarters staffs, and party organizations are concentrating their attention in the training and indoctrination process on further improving the professional skills of flight and engineer-technician personnel, communications and aviation rear services specialist personnel on approximating training of troops to a maximum degree to the conditions of actual combat. The principle of "Teach the troops that which is necessary in war," which has been tested and proven by practical realities and the experience of history, has been adopted.

Realism and firmness in appraising the achieved level of military readiness, air, weapons and tactical proficiency of aviation personnel, discipline and flight safety have become a characteristic feature of the restructuring of style and work methods of Air Force leader-echelon command and political cadres which is in full swing. One can clearly see a trend toward demanding and objective determination of a practicable level of military expertise, effectiveness of command and control, and mastery of modern aircraft systems and flight operations support assets at the present stage of development of our Air Forces.

The complexity of restructuring is becoming increasingly more fully revealed with each passing day; the scale and scope of the job to be accomplished is becoming more fully evident. The degree to which certain notions about the training of Air Force cadres, improvement of command and control, leadership and management, moral and ethical demands still lag behind today's tasks is becoming increasingly clearer. We must get rid of the old and work persistently in the quest for innovative solutions, and we must display an innovative approach to things.

Precisely such an approach is typical of the first accountability reports and elections in party organizations of Air Force units and subunits since the 27th CPSU Congress. In an atmosphere of truthfulness, demandingness, and glasnost, the Communists in the Air Forces are seeking the most effective ways to increase the combat readiness of Air Force units and combined units. Emphasis is being placed on the personal responsibility of party members, and those who are working in the new manner, with a full return on efforts and energy, are being set up as an example. There are fewer and fewer of those who are failing to grow, who are merely marking time, who have not yet prepared themselves mentally for intensive, results-producing military labor. At the same time, in objectively appraising the state of affairs, one should acknowledge that not only are positive trends developing and being firmly adopted, but that negative factors are also in operation, adversely affecting the course of perestroyka. They are sometimes of an objective character, but most frequently they come from inertia, from deep-rooted bad habits, indifference and excessive attention to form with consequent detriment to content in both training and competition.

The increased demands on accelerating intensification of the training and indoctrination process have been perceived in a formalistic manner in some quarters. They receive approval in word, but in certain Air Force units and subunits methods of solving pressing, urgent problems have changed little. This can be seen particularly clearly from the performance results of the last training year and the results of performance evaluation inspections of Air Force units and combined units. It is important at the present time to have a thorough and comprehensive understanding of the reasons for errors and miscues, to think about and correct deficiencies and shortcomings occurring in organizing training classes, training drills, flight operations, and tactical air exercises. We should not rest on our laurels; we must work persistently to move forward, always seeking to achieve more -- this is a party tradition and a mandatory condition of perestroyka!

The events which are taking place clearly indicate that a tense, explosive world situation has developed. The campaign for disarmament and international detente takes on special significance in this connection. The CPSU Central Committee and the Soviet Government are constantly bringing forth initiatives and specific proposals aimed at resolving the most important problems pertaining to preserving peace and international security. Among the most important of these peace-seeking actions are the nuclear test moratorium and the program calling for eliminating nuclear weapons by the end of the 20th century.

The foreign policy of the Soviet State is directed toward securing favorable international conditions for building communism in the USSR, toward strengthening the position of world socialism, supporting the struggle of peoples for national liberation, and implementation of the principle of peaceful coexistence of states with different social systems. But this policy is not to the liking of militaristic reactionary imperialist circles. The meeting in Reykjavik laid bare with renewed force the ambitions of empire on the part of the present U.S. Administration, which has taken a dangerous course of policy toward escalating the strategic arms race and utilization of space for military purposes.

In the current international situation the Soviet State openly declares that it will always fight for peace and progress on this planet and for the security of the Soviet Union and its allies. At the same time the USSR will work persistently on continuing a vigorous campaign for disarmament, and the Soviet proposals presented at Reykjavik remain on the table. The visit to India last November by Comrade M. S. Gorbachev, General Secretary of the CPSU Central Committee, and his talks with Indian Prime Minister Rajiv Gandhi are of great significance for impoving the international situation and preservation of peace.

Military airmen, just as all Soviet Armed Forces personnel, enthusiastically and unanimously approve of and support the foreign and domestic policy of the CPSU and Soviet State and the decisions of the 6th Session of the USSR Supreme Soviet, 11th Convocation. The documents adopted at this session are of great importance for successful development of our socialist economy and for accomplishment of the large-scale tasks advanced by the 27th CPSU Congress in our country's socioeconomic development and in enhancing its defense capability. Air Force personnel are filled with resolve in 1987 -- the year of the 70th anniversary of the Great October Revolution -- to make large strides in increasing the combat readiness of units and subunits and in further improving air combat, weapons, and tactical proficiency. Military airmen view as their patriotic and internationalist duty to guard reliably and vigilantly the peaceful, productive labor of the Soviet people, the great achievements of socialism, and to be in a continuous state of readiness guaranteeing an immediate rebuff to any aggressor.

3024
CSO: 9144/044

PROBLEMS OF LEARNING FORMATION FLYING

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 87 (signed to press 4 Jan 87) pp 8-9

[Article, published under the heading "Be Alert, In a Continuous State of Combat Readiness," by Maj V. Aleynov: "Wing to Wing"]

[Text] A practice alert sounded early that morning. Airmen quickly made their way to the airfield. At the designated time pairs of missile-armed jets streaked skyward: their mission was to destroy "aggressor" equipment moving up toward the "line of contact."

After takeoff, the command post received brief reports from the element leaders that the two-ship elements were on the prescribed heading. The marks on the flight operations officer's plotting board coincided with the plotted-out flight path. But soon the smooth line of dots on the plotting board seemed to scatter. The aircrews had commenced maneuvering to evade antiaircraft fire. At the designated point the blips on the radar disappeared: the aircraft had descended to a much lower altitude.

Squadron commander Maj F. Belov closely monitored the tactical communications channel, ready instantly to assist the aircrews with advice. Several minutes passed, and the strike group entered a grid square in which, according to intelligence, there was supposed to be an "enemy" troop concentration. The pilots proceeded to search. Flight commander Capt G. Berezovoy was the first to spot tanks and armored personnel carriers. They were standing concealed along the edge of a tract of forest.

"This is 053, target ahead to the left," he reported to the squadron commander.

"Roger. I see it," Major Belov's voice came over the radio.

The attack took seconds. Closely-grouped explosions straddled the target. The other aircrews followed the squadron commander's two-ship element in and pounded the target. The airmen successfully accomplished their assigned mission.

There is a term used in military aviation: a sense of the leader's wing. It means that a subunit has good precision formation flying ability, that every pilot has an excellent mastery of flying technique, enabling them to perform with precision even during high-intensity maneuvering. Precise, sure flying ability was a large factor in predetermining the squadron's success at the tactical air exercise, yet quite recently the situation regarding precision formation flying was very different.

Young pilots Sr Lts I. Borus, N. Podletyuk, and S. Astashev felt a great lack of confidence in formation flying and would make mistakes. In particular, Sr Lt I. Borus had difficulties when shifting formation -- he was poor in gauging distance to his flight leader and was unable correctly to determine the moment at which to throttle back, as a result of which he frequently would overrun the flight leader.

For the sake of fairness we should note that the people in the squadron were not merely twiddling their thumbs. They were working hard. During commander training the pilots would place their aircraft on the ground at specified lateral and forward spacings, would conduct cockpit drills, and they would conduct walking-it-through practice sessions [air combat or formation flying with model]. The pilots' confidence in combat-formation flying grew from one practice session to the next.

Maj N. Artyukhov and Capts S. Zavolodko and P. Kalik worked hard. Carefully analyzing the flight data recorder tapes, the instructors spotted the slightest errors made in the air by the young pilots. Capt S. Zavolodko, for example, analyzing a training flight by Sr Lt S. Astashev, concluded that the latter was making abrupt throttle movements. As a result he was unable firmly to hold his position in formation. This young pilot gradually corrected his mistakes with the assistance of his flight commander.

I do not believe there is any need to argue that formation flying is a complex kind of combat training, since this type of flying clearly reveals the pilot's level of professional skill. It is impossible to find a common denominator here. Success in multiple-aircraft air-to-air combat or in delivering a multiple-aircraft strike on a ground target depends entirely on the formation flying proficiency of the pairs and flights and the ability of the pilots in the group to work with the weapon sight and weapon system, to search out the target and to perform individual aiming. A sense of one's comrade's wing is very important here.

The experience of the Great Patriotic War convincingly demonstrated that victories are won primarily by those who have gained a total mastery of formation flying. And the results of a combat mission depend in large measure on the flight commander's ability to control his element with precision. When allowing a pilot to go up solo as a member of a formation, the flight commander should be sure that the pilot is fully ready. I shall cite the following example as confirmation of the above.

Military Pilot 1st Class Capt T. Udayev was to go up with Lt G. Khramtsov. On the eve of the flight operations shift the instructor was unable fully to determine the preparedness of his subordinate to accomplish the flight

assignment, which led to a mishap-threatening situation. After taking off at the prescribed time interval, Lieutenant Khramtsov proceeded to attempt to accomplish join-up by catching up from behind, but he was unable to spot the leader. The pilot lost his composure. Lacking precise knowledge of how to proceed in such a situation, he increased airspeed without permission and... shot past the leader dangerously close. A tragedy was narrowly averted.

This happened quite some time ago, but I mentioned it for a reason. At that time it served as a bitter lesson for everybody. The pilots realized the potential consequences of carelessness in preparing for a training sortie. At first glance, however, everything seemed to be proceeding correctly. Lieutenant Khramtsov nicely traced out the flight in his workbook and copied down the duties of the wingman and procedures to follow in case of accidental cloud penetration.

His preparedness was also tested. But how? Standard questions were asked, even ones which were irrelevant to the forthcoming flight. Even the flight rehearsal was not conducted on dynamic basis but broken down by individual phases, and selectively. In short, preparation was given lip service. The end result was not at all surprising.

The experience in training combat pilots for formation flying amassed by Capt S. Zavolodko is in my opinion instructive. Usually after performing calculations and studying methods recommendations and the appropriate sections of the manual, the aircrew proceeds to work out a model of the training sortie. After refining and detailing points of theory, the pilots proceed to "walk it through." The flight is rehearsed several times, from the moment of taxiing out and positioning the aircraft on the runway ready to take off right through to engine shutdown. During this period the flight commander introduces various scenario changes and requires that his men respond with precision in the developing situation.

This does not end the preparatory period. Captain Zavolodko's flight again assembles for preflight preparation. All fine points of the forthcoming training sortie are refined and detailed taking into account specific weather conditions and specific features of the tactical environment at the range. The flight commander reminds his men to maintain precise, strict position in the formation, and instructs them to be brief in their radio communications. This is correct procedure, since precision control is very importnat in formation flying.

I should also like to mention the following item. Some flight commanders are of the opinion that strict radio silence should be maintained during formation flying and that wingmen should understand their leader from his maneuvers. This is without question the standard procedure for experienced pilots. It is necessary to make adequate use of the radio in training young pilots, however, giving them warning of each upcoming maneuver and change in flight configuration. Nor is this being overly cautious; it is merely elementary observance of safety rules and procedures. One should never lose sight of this fact.

At times pilots express the opinion that the main thing in formation flying is precisely to maintain one's position in formation, while all the rest is not so important. This is profoundly erroneous. Take, for example, such an element as return to the airfield and breaking formation for the landing approach. As a rule it takes place in view of all personnel, and people judge a pilot's professional expertise from this transition move. Aware of this fact, some pilots attempt to do the airfield flyover at reduced parameters and to fly the landing approach with minimum forward separation. As a result of a "dashing" formation breakup, a wingman frequently gets dangerously close to the element leader, hindering a safe landing approach.

As we see, there are plenty of problems involved in training pilots in formation flying. But all of them can be resolved if approached intelligently, with strict observance of the requirements of the appropriate documents. This is eloquently attested by the experience of our vanguard airmen.

3024
CSO: 9144/044

PROBLEMS OF BREAKING IN NEWLY-COMMISSIONED OFFICERS DISCUSSED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 87 (signed to press 4 Jan 87) pp 10-11

[Article, published under the heading "Problems of Development of Young Officers," by Doctor of Psychological Sciences Col V. Yusov and Candidate of Psychological Sciences Col P. Korchemnyy: "Performance of Duty With Maximum Effort"]

[Text] The process of development of young officers as pilots and commanders usually involves surmounting numerous difficulties. As is indicated by the experience of aviation units and sociological research, difficulties include insufficient knowledge and skills on the part of some recent officer candidates, deficiencies in their personal qualities, as well as difficulties in rapid adaptation to new conditions of performance of job duties in line units. In response to a questionnaire on difficulties experienced by flight school graduates during the initial period after receiving their commission, for example, more than half of those surveyed stated organizational and psychological-pedagogic problems connected with breaking in, becoming a part of the collective, and restructuring of consciousness to the qualitatively new level of demands placed on the combat pilot and line officer.

How fast and with what expenditures of mental and physical effort as well as material resources the objective and subjective difficulties of the breaking-in and familiarization period are overcome depends in large measure both on the degree of effort and diligence of the lieutenants themselves and on the organizational and pedagogic skill of their superiors, political workers, and all those who are entrusted with training and indoctrination of young pilots.

A businesslike, innovative approach, figured for the long haul, to work with young replacement personnel is characteristic, for example, of command authorities, party and Komsomol organizations of the aviation regiment in which Gds Lt Col V. Smirnov serves. We would particularly like to stress that from the very day of arrival of young pilots, every effort is made to support and develop their thirst for knowledge and purposefulness, focus on maximum results in mastering modern aircraft and weapons, tactics, and skills in organizational and indoctrination work with personnel. Of course in this regiment proper attention is devoted to the intermediate stages in the process of professional development, to quality and efficiency in accomplishing tasks

at each stage. At the same time the efforts of the young officers and their superiors are constantly focused on achieving excellent end results in combat and political training.

...Another flying day was over. As they waited for the preliminary analysis and critique of their training flights, the young pilots engaged in a lively discussion of their training sorties and shared personal impressions. They conducted a highly-professional discussion of successes and shortcomings in accomplishing assigned tasks, of causes of mistakes and miscues, and the specific features of flying a new aircraft in various flight configurations and the concomitantly greater demands on theoretical preparation and flying skills. One sensed that these lieutenants had a pretty fair understanding of aerodynamics, technique and tactics and possessed highly-developed analytical thinking.

The preliminary analysis and critique of the training sorties, conducted by Gds Lt Col V. Smirnov (he had recently been promoted), confirmed that the squadron's young members were activists not only in word but in deed as well. Together with the veteran experts at air combat, a substantial contribution toward accomplishing the tasks assigned for the flight operations shift was made by Gds Lts V. Yerygin, B. Petrenko, V. Izotov, and others.

Soon we had the opportunity to meet these officers. The young pilots noted, willingly admitting difficulties in frank conversation, both problems they had already experienced and those which arose as assigned tasks became more complicated, that an attitude focused on maximum efforts in training and performance of job-related duties does not allow one to give up in the face of setbacks but compels one to seek out and find, with the help of commanders and more senior comrades, the most effective ways to correct elucidated gaps and errors. In short, it enables them to work better and with greater results both on the ground and in the air.

"When you have an end goal in sight, you cannot help but ask yourself whether each step is bringing you closer to it or further from it," Gds lt V. Yerygin shared his thoughts. "Let us assume that my superior has grounded me from a flight operations shift for poor flight preparation. I am not scheduled for the next flight operations shift. Time passes, but there is no real progress toward combat proficiency. This is an entirely realistic situation and, since we do not want to find ourselves in it, I and all my comrades are willing to work as hard as is necessary in order to keep progressing. If you want to do a good job of flying and engage in air-to-air combat boldly and knowledgeably, you have to give your all in training. We were told this time and again back at flight school."

The young lieutenants sensed from the very first interviews and familiarization talks with unit and subunit leader-Communists in the line regiment how correctly they had been focused back in service school toward persistent, selfless labor. Acquaintance with the history and fighting traditions of the guards unit, immediate and long-term combat and political and training tasks, in accomplishing which the young officers were to play an important part, as the commanders and political workers stressed in interviews with the newcomers, helped form a psychological attitude favoring maximum

effort in performing their duties. Comradely advice by pilots who had already been in the regiment a year or two, as well as dissemination through oral and graphic publicity of the experience and know-how of the finest combat pilots helped the young lieutenants more rapidly grasp what was required of them for successful breaking-in and familiarization as well as their further professional growth and development. The command authorities also sought to ensure that each individual clearly understood the plan and method of breaking-in and familiarization and the conditions for achieving the stated goal. This helped form the required psychological attitude in the young pilots.

From the very outset the unit party committee and Komsomol committee, leader-Communists and the squadron party organization devoted considerable attention to the young pilots. Soon after the replacement pilots arrived, for example, the party committee discussed at a meeting measures to assist the command authorities in training and indoctrinating the young officers.

Word was followed by deed. The regimental command authorities and party committee held instruction methods classes for flight commanders, party and Komsomol activists on the most complex items pertaining to training and indoctrination of the newcomers as well as organization of party-political work during the period of their breaking-in and familiarization. Regimental deputy commander Gds Lt Col V. Ivanov and headquarters party buro secretary Gds Maj G. Shapov, recently reassigned to the unit from the limited Soviet forces in the DRA, shared their experience and know-how in breaking in replacement personnel and in forming excellent moral-political, fighting and psychological qualities in the newly-commissioned lieutenants. The party committee attached great importance to the conduct of socialist competition among young aviation personnel and providing normal housing and living conditions as well as fruitful independent study.

Responding to this concern, the young lieutenants displayed a proper sense of responsibility and great eagerness in mastering an aircraft which was new to them. Their knowledge and skills increased day by day, from one training sortie to the next. The squadron command authorities, party committee and party organization closely monitored the professional development of these officers, their moods and attitudes, and responded immediately to the slightest indications of diminished job-related and sociopolitical activeness.

At one time several of the young pilots, who apparently did not have an entirely clear understanding of the substance and significance of the practice drill method in forming flying skills, psychophysiological, psychological and emotional qualities, were of the opinion that many elements of their ground and air training were being repeated too frequently and without need. The lieutenants repeatedly attempted to convince their flight commanders and comrades in the party and Komsomol organizations of this.

In the opinion of the command authorities, the best way to influence the attitude of the young personnel and to help them grasp the erroneousness of jumping to hasty conclusions was a detailed analysis of successes, and particularly of deficiencies, for facts speak much more loudly than words. At the commanding officer's instructions, the headquarters staff prepared

requisite data for a work meeting with the young pilots and their instructors. They provided a clear-cut, objective picture of the state of affairs in synthesized form, and all the lieutenants' "arguments" melted away in the course of the presentation. In conclusion the commanding officer advised his subordinates to place less weight on number of drills and practice sessions, to devote greater attention to quality of mastering of assigned tasks, and to endeavor to ensure that each and every day and hour of training classes and flying produced genuine improvement in flying, weapons, and tactical proficiency. Certain leader-Communists were cited for poor checkup and monitoring and an uninnovative approach to organization and methodology of instructing the young pilots, which led to boring practice sessions and training drills.

This important discussion was soon continued at an open party meeting. The keynote speaker was the then squadron deputy commander for political affairs, Gds Maj V. Khokhlov, while the flight commanders, pilots and aviation engineer service specialist personnel who took part in the ensuing debate analyzed in detail training progress and results and the process of breaking in the recently-commissioned lieutenants, as well as measures to strengthen party influence on this process. In particular, they discussed increasing the personal responsibility of the young officers and their commanders for strict observance of flight safety rules and procedures, as well as effectiveness of preventive indoctrination work. While preserving the young pilots' mood and attitude toward maximum diligent effort, it was important at the same time to keep them from potential problems and to instill in them the habit of following to the letter the rules and regulations governing flight activities. This was essential.

At one time, for example, Gds Lt S. Dorofeyev began to do a poorer job of preparing for training flights. It was also noted that he was excessively casual about receiving his aircraft from the technician prior to taking off. Critical analysis of the quality of this officer's work performance in the course of the post-flight debriefing and critique, in the course of totaling up combat training and competition results, as well as individual talks with him by subunit leader-Communists helped Dorofeyev overcome a temporary slump in productive, meaningful activity. We were also told that Gds Lt V. Nasalivets had begun displaying a cavalier attitude toward safety procedures. This officer was made to appear before a meeting of the Komsomol committee, at which they made it clear to him that a slack attitude toward the rules and procedures of flight operations would not be tolerated in the outfit. This and other measures to exert Komsomol influence helped the pilot acknowledge the error of his ways and revise his attitude toward his job duties.

Six months later the party committee received and discusssed a report by the squadron deputy commander for political affairs on progress in instilling excellent moral-political, fighting and psychological qualities in the young flight personnel and measures to achieve further improvement of the training and indoctrination process. The party committee's recommendations helped in formulating a uniform policy and in mobilizing the efforts of the subunit's leader personnel and party organization toward high-quality accomplishment of tasks pertaining to further professional development of the young lieutenants.

Vigorous, purposeful organizational, training and indoctrination work by regimental and squadron command authorities and party organization made it possible to maintain a strong spirit on the part of the young pilots during their period of breaking-in and familiarization in the line unit. All of them successfully completed the year's scheduled program of breaking-in and improvement of combat skills, and their psychological preparedness to carry out complex combat training missions and to respond to unexpected or emergency situations became improved.

Precise, intelligent actions by Gds Lt V. Petrenko of Gds Capt N. Kopachevskiy's flight serve as graphic confirmation of this. During takeoff as part of a two-aircraft element, Petrenko discovered that something was wrong with his controls. Reporting the situation to the flight operations officer, he aborted takeoff, cut throttle and, skillfully utilizing his brakes and drag chute, kept his aircraft on the runway. The senior-level commander presented Gds Lt V. Petrenko with an award for tenacity and skill displayed in a difficult situation.

In an interview with us this officer commented that he had been fully prepared to respond to this or any other difficult situation by virtue of the work conducted with him and the other lieutenants on improving flying skills and moral-psychological conditioning. In addition, on the eve of the flight operations shift Petrenko had read in a pamphlet a description of a similar incident and a detailed account of the actions of a pilot who had successfully coped with a critical situation. He remembered this, and it came in handy.

Young officers sometimes lack such confidence and knowledge in working with their subordinates. Since the young pilot lacks experience, there is some tendency to underestimate his role as commander and indoctrinator. This evidently was a factor in the attitude toward military education science, psychology, party political work and other "non-specialization" subjects at service school. In the regiment, in spite of instructions and advice by commanders and political workers, the young lieutenants also at first failed to attach particular importance to their psychological and pedagogic training. They felt that the main thing for them was to start flying as soon as possible and to master on schedule what was for them a new aircraft.

Practical realities compelled rejection of a one-sided approach to tasks pertaining to breaking in the novice pilots. In constant contact and communication with pilots, technicians, mechanics, and supporting subunit specialist personnel, the young officers felt the need for mutual understanding, a firm and frank assessment made taking the human factor into account. But this proved to be no easy matter. It was necessary to study the art of organizational and indoctrination work. They were helped by their superiors and older comrades. Considerable benefit was derived from get-togethers with veterans of the unit, the finest methods experts, as well as an exchange of experience and know-how in political indoctrination work, lectures, seminars, and demonstration classes on planning a young officer's working day.

Unit command authorities and squadron Communists sought to ensure that an attitude to achieve the maximum was displayed not only in flight operations

but also in development of the lieutenants as commanders and indoctrinators. The requisite conditions were created for this. Soon after the young pilots' arrival in the regiment, they were drawn into volunteer work. Some of them were elected as Komsomol committee and buro members or as flight Komsomol group organizer, while others became agitators, athletic organizers, and members of wall newspaper editorial boards. At the advice of the unit political worker, a permanent topical exhibit of problems of psychology and education science was set up in the library. Consultation sessions were regularly held on practical matters pertaining to employment of various forms and methods of indoctrinational work. The purpose of lectures and seminars in the officer Marxist-Leninist training system was to add continuously to the young pilots' knowledge of theory.

Support of initiative and independence on the part of young personnel by the squadron command authorities, party committee and party buro was of considerable importance for development of the young lieutenants as organizers and indoctrinators. The officers took active part in preparing for and conducting specific-topic morning and evening activities, quizzes and youth competitions, field trips to historic sites, amateur talent concerts and sports competitions. For this it was necessary closely to scrutinize personnel, to find assistants, and to learn to make full use of their abilities, proclivities and interests. According to the young officers, they themselves came to the conclusion that it is not enough just to have a fleeting conversation with technicians and mechanics at the airfield. One should visit the barracks more frequently and not feel shy about visiting their colleagues at their quarters. It is only in close communication with people that one gains an understanding of the nuances of their behavior and moods as well as experience in employing various forms and methods of indoctrinational effect, although this too is only a small part of one's daily work, which includes concern for a healthy moral and psychological atmosphere for every aviation collective, concern with the living conditions and off-duty activities of one's subordinates and a harmonious combining of personal and public interests, instilling love of aviation, of one's occupational specialty, and a striving to become the equal of the top performers.

Command personnel and political cadres, including in the Air Forces, guidelines of the CPSU Central Committee and 27th CPSU Congress, and instructions by the USSR Minister of Defense and the chief of the Main Political Directorate of the Soviet Army and Navy on enhancing the indoctrinational role of service in the Armed Forces and placing greater emphasis on the human factor in achieving maximum end results in labor and in military affairs focus one precisely on such efforts.

3024
CSO: 9144/044

PERFORMANCE BACKSLIDE BY FIGHTER-BOMBER REGIMENT

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 87 (signed to press 4 Jan 87) pp 14-15

[Article, published under the heading "Following a Policy of Restructuring," by Military Pilot 1st Class Col N. Chava:"Mesmerized by Past Accomplishments"; first paragraph is AVIATSIYA I KOSMONAVTIKA introduction]

[Text] Experience does not come by itself. It is accumulated bit by bit in the process of intensive daily military labor. Making it available to all and increasing achievements is an important task which does not tolerate mere brief bursts of enthusiasm and which requires specificity and purposefulness in the activities of any Air Force collective. Certain leader personnel sometimes forget this, however. Once they have achieved success, they naively assume that it will always attend them, by inertia so to speak. But things do not work that way....

A certain fighter-bomber regiment is rich in combat traditions. It has produced seven Heroes of the Soviet Union. Hero of the Soviet Union Vsevolod Aleksandrovich Shiryayev is entered permanently on the rolls of this regiment's 1st Squadron. On 15 August 1942 he took off on a combat mission immediately following a party meeting. Flying a ground-attack strike, this intrepid combat pilot, in the Gastello manner, aimed his burning aircraft at a fascist truck column....

The magnificent deeds of the combat veterans place a great responsibility on the present generation of airmen, first and foremost to build further on fighting traditions with their selfless labor.

Until recently this combat collective was really moving ahead, as they say. The regiment was awarded a pennant of the district air forces Military Council for excellent results in combat and political training and for resolute, skilled actions at tactical air exercises. And although it did not take first place in socialist competition, it was right up there among the leaders. Its combat training schedule had been fully completed and with excellent qualities, which provided good momentum for the future. Therefore the airmen's decision to earn the regiment a ranking of excellent appeared to be fully warranted.

Commanders and political workers realized that the task could not be accomplished by appeals alone. The subunits proceeded to work toward improving the men's proficiency. The results of a performance evaluation of combat and political training for the winter period last year indicated that the outfit had on the whole successfully accomplished assigned tasks. One could already note at that time, however, a tendency toward a slowing in the pace of improvement in aircrew combat readiness and restructuring in one's work activities, taking into account the demands of the 27th CPSU Congress. In particular, aircrews were unable to achieve consistently high performance results in weapons delivery. Engineer and technician personnel under the command of officer N. Rachkov were also performing below their capabilities. There were also other deficiencies in the training and indoctrination process and in competition.

The combined unit's headquarters staff and political section directed the attention of this outfit's leader-Communists time and again to deficiencies and unnecessary relaxation of demands, and they gave practical assistance in correcting mistakes, but no substantial changes were accomplished. The impression was created that regimental commander Col N. Bratashov and his deputies were mesmerized by past accomplishments and were looking at the state of affairs in the outfit through rose-colored glasses. As a result the socialist pledges made by personnel failed to be met. The initiator of competition in the district air forces lost ground.

I shall state quite frankly that the main reason for the setback lay in poor organizational activity by the commanding officer, his staff and the party organization pertaining to accomplishing the combat and political training plan. The faulty practice of unit leader personnel usurping the functions of the subunit commanders led to a situation where the latter lost their independence and became less aggressive in innovative search for optimal ways to accomplish tasks. In addition, a low degree of demandingness on the part of leader-Communists, an inability efficiently to organize the training process, and also at times a disinclination to acknowledge one's own errors and mistakes led to poor coordination in the activities of leader personnel. A situation developed which was similar to that described in I. Krylov's fable "The Swan, the Pike, and the Crayfish"....

Nevertheless it was believed in the unit that in spite of all setbacks the outfit was still a strong one and that the majority of pilots were experienced combat fliers, and therefore would produce excellent results if it became necessary. This opinion, like a lullaby, served to lull superiors who were already fairly lacking in vigor and activism.

At this moment command personnel and party committee should have sounded the alarm, drawn proper conclusions from past mistakes, and undertaken specific measures to resolve the acute problems, particularly since higher headquarters had pointed to the necessity of increasing effectiveness of the training process and rooting out an excessively formalistic approach and unnecessary situation simplification in training flight personnel. In conversations with Colonel Bratashov, senior comrades frankly stated that it was necessary to fly not for the purpose of building up total hours logged but to achieve purposeful preparation of aircrews to perform specific missions. Time and

again it was recommended to the commanding officer and his deputies that they thoroughly and comprehensively analyze accomplishment of the combat training plan and organize planning and scheduling in such a manner that not one single pilot would be ignored. Senior-level commanders advised that they analyze substantively and in detail the results of combat flying and weapons delivery, that they not limit themselves to half-measures but seriously address the matter of improving their men's skills in achieving the accuracy potential of their aircraft's integrated bombsight, weapons aiming and navigation system.

Unfortunately at a certain moment it was not possible to overcome the passivity on the part of the unit's leader personnel. I shall be frank: we saw shortcomings, but we were unable to display firmness. Apparently an old ailment was showing its presence -- substituting "valuable instructions" for specific help.

This served further to aggravate the state of affairs in the regiment. Mistakes which had been made by leader personnel and certain of their subordinates resulted in tangible losses, doing detriment to the conscientious labor of the entire collective. Shortcomings in organizing methods work, which falls within the area of responsibility of Lt Col A. Golovchenko, led to a situation where flight commander Sr Lt O. Yermakov and his wingman, Lt V. Lebedev, had an air mishap due to errors in flying technique. The principal cause was lack of pilot proficiency and the pilots' poor ground preparation for the training sortie.

It would seem that this accident would have sounded an alarm to leader personnel and impelled them to action. Not in the slightest! Problems which had piled up and which were not being resolved continued amassing and pulling the collective back.

During a tactical air exercise aircrews were assigned the mission of knocking out "enemy" missile launchers. Although the aircrews prepared in advance for this maneuver sequence, officers S. Vorotnikov, I. Sharsheyev, V. Bodyagin, and A. Sukhoivan failed to accomplish the mission on the weapons range. The other aircrews tried to compensate for this mission performance failure. The two-ship element led by Maj P. Lazutin, for example, delivered an accurate strike and received a mark of excellent. This successful performance should have been followed by others. Nevertheless Pilots Majs K. Polyakov and N. Kutuzov, and Sr Lts V. Demyanovskiy, I. Polivtsev, G. Anishchenko, and S. Lysenko failed to come through.

This failure was also quite logical. Flight personnel performed in a tentative manner right from the very beginning of the tactical air exercise, with aircrews waiting for instructions from the command post at every pretext. Squadron commanders Lt Col S. Vorotnikov and V. Karagachev, who had not become accustomed to independent evaluation of the air and ground situation, were unable to make a correct decision. Air defense penetration tactics showed a predictable pattern and were ineffective. Heavy losses would have been inevitable in actual combat.

This is what happens when higher-echelon leader personnel usurp the functions of subunit commanders in daily routine training.

Pilots of the wartime generation learned the science of winning at a considerable price. Combat constantly confirmed the fact that he who was unable or unwilling to think, he who grasped at predictable, unimaginative pattern and routine, inevitably suffered defeat. I believe that it would be appropriate here to quote a statement by Lt Col A. Smykov, a regimental commander during the war. On 8 August 1943 he stated during the ceremony of presentation of the colors to his unit: "The regimental color [combat banner] is the Banner of our Homeland, which has reared us and given us our destiny. We shall carry this Banner with honor through the ordeals and dangers of war until we have totally destroyed the enemy and liberated our country."

These words provide food for thought to all of us -- successors to the glorious deeds of the wartime combat fliers. In carrying on the regiment's fighting traditions, personnel should do everything possible to learn that which is essential in war.

The setbacks of this outfit also compel us, representatives of higher headquarters, to step up the pace of restructuring of our consciousness, to reject outmoded stereotypes of thinking, and to seek to achieve a clear understanding of our new tasks. We must look at things with greater firmness and frankness, as the party instructs.

In analyzing deficiencies occurring in the regiment in question, we view them as a mirror reflection of our own deficiencies. It seemed to us that since the regiment was right alongside, as they say, we would see everything and know everything going on in it, always giving timely assistance in resolving problems which arise. But things proved to be different. Such an important element in work activities as verification of execution of instructions was omitted, and this engendered a lack of responsibility and lack of organization in the work of some leader-Communists.

Immediate steps had to be taken. The work accomplished in the collective to correct deficiencies has produced initial results. Things have begun to take a turn for the better. At the same time we realize that these shoots of new and positive development have not yet become strong, have not yet been transformed into powerful treetrunks, and therefore they require greater attention. This means we must more resolutely move from general words to specific deeds. We see in this the meaning of the restructuring which is taking place in this country and in the military.

3024
CSO: 9144/044

HELICOPTER PILOT SEES COMBAT IN AFGHANISTAN

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 87 (signed to press 4 Jan 87) pp 16-17

[Article, published under the heading "They Were Decorated by the Homeland," by Col Ye. Besschetnov: "Overcoming"; first paragraph is AVIATSIYA I KOSMONAVTIKA introduction]

[Text] Party member Military Pilot 1st Class Col V. Pismennyy was born in Aktyubinsk in August 1950. He graduated from service school 15 years ago. Pismennyy was awarded the Order for Service to the Homeland in the USSR Armed Forces, 3rd Class, as commander of a helicopter squadron. He was awarded the title Hero of the Soviet Union for courage and valor displayed while rendering internationalist assistance to the people of the DRA as a member of the limited Soviet forces in Afghanistan. Vyacheslav Mikhaylovich Pismennyy is presently serving as deputy commander of air forces of the Central Group of Forces. The following article discusses his career in aviation and his military service during these years.

His voice is calm, firm, confident. I listen intently to every word, endeavoring to grasp what feelings and thoughts control Vyacheslav Mikhaylovich. It is not difficult to guess from the enthusiasm with which he speaks about flying the skies of Afghanistan and about his comrades in arms that flying is the aim and main content of his life.

"I understand that at one time you intended to leave aviation."

"That is true. It was rashness of youth," replied Pismennyy with a grin. "I was about to write a formal request to drop out of Air Force school. Fortunately, though, I saw the light in time.... And my father, Mikhail Filippovich, a man of strong will and sober deliberation, put me on the right track in time, as they say."

Years of study passed. On the whole he passed the state examinations with good marks, but received a mark of only satisfactory on knowledge of Air Force tactics.

I asked Vyacheslav Mikhaylovich what things he recalled from his first years as an officer. He replied briefly: "There was nothing of particular note. Like most service school graduates...."

And yet one cannot call the beginning of Pismennyy's officer career commonplace. This young officer, reporting to his duty assignment with an aviation regiment in the Red-Banner Belorussian Military District, soon stood out among the newcomers by virtue of his labor and conscientious attitude toward his job. And I believe an important role in this was played by his endeavor to move forward, in spite of difficulties, to work persistently toward the stated goal. This quality became an integral feature of his character.

Pismennyy was made an Mi-8 helicopter copilot-navigator. This was a new aircraft for Vyacheslav, and he set about eagerly with his conversion-training. Soon he had mastered the equipment fairly well, successfully passed the qualification tests, and proceeded to fly. Flying as copilot-navigator, he worked hard on mastering flying technique. Soon before commencement of the next training year, this officer was made a helicopter commander. Some time later he was promoted to flight commander.

There is no need to mention all the difficulties which faced this lieutenant in his busy commander's job. He lacked experience, but he needed to be able to plan, schedule and organize the training process in his flight and to teach and indoctrinate others. Once again he remembered something his father had said to him: do not give in to difficulties, but work boldly to overcome them.

The flight commanded by Pismennyy had a good reputation in the regiment. He himself was also making confident progress as a military flier. Of course this young flight commander was not merely left to his own devices: his older comrades, and his squadron commander in particular, helped him master flying skills and acquire the abilities of a skilled mentor of his subordinates. It was the squadron commander, for example, who took pains to train Pismennyy to work as an instructor. It was in part due to his help that Vyacheslav Mikhaylovich passed the examinations for second class, and a year later for first class.

In November 1973 Pismennyy was promoted to senior lieutenant, and 6 months later he was promoted to the position of squadron deputy commander. In addition, this officer who once had received only a mark of satisfactory on air-force tactics was made a member of the unit's methods council, and quite deservedly. During his two years of service in the regiment he had proven himself to be a skillful, methods-competent instructor for his pilots. Training year final performance results placed the squadron as tops in the unit. Senior Lieutenant Pismennyy joined the Communist Party. The regimental command authorities took due note of his accomplishments and made him squadron commander. And yet it had only been four years since his graduation from pilot school.

After taking over command of the helicopter squadron, Vyacheslav Mikhaylovich maintained proper order and procedure and established a smooth, precision training and indoctrination process, supported by his deputies and the party

organization. Three months later, coinciding with the anniversary of the Soviet Army and Navy, Capt V. Pismennyy was awarded the Order for Service to the Homeland in the USSR Armed Forces, 3rd Class, for excellent performance results in combat and political training.

Vyacheslav Mikhaylovich commanded the helicopter squadron for two years. This was a difficult, work-filled period in his life. And he handled his duties in excellent fashion. In addition, he was able to prepare well for the examinations and entered the Military Air Academy imeni Yu. A. Gagarin. After graduating from the academy in the summer of 1980, he joined the limited Soviet forces in the DRA, as a replacement for Hero of the Soviet Union Military Pilot 1st Class Maj V. Gaynutdinov, who had been killed on Afghan soil.

"Back at the academy," related Vyacheslav Mikhaylovich, "we learned about the exploits of pilot-internationalists Gaynutdinov and Shcherbakov, who were given the homeland's highest honor. Naturally I also wanted to be sent to the DRA to test my mettle in a difficult business."

Maj V. Kopyl was Pismennyy's first mentor in Afghanistan. He shared his experience and know-how in cross-country mountain flying, landing on high-mountain sites, related to him the ways of the dushman [Afghan rebels], and taught him how to dodge their fire. It was not necessary to explain anything to Pismennyy twice -- he committed it firmly to memory the first time around. Within a few days he was flying dangerous missions on an equal footing with the others, assuming full responsibility for the outcome of each sortie.

Once at the end of the day, however, the airmen were informed that Soviet assault troopers had been ambushed by dushman in the mountains. If they were not pulled out immediately they would perish.... Major Pismennyy, who was acting as commanding officer in the latter's absence, obtained a detailed briefing, considered the possibilities, and decided to go out himself, also taking along the two most experienced aircrews.

The sun was just setting, but bluish dusk was already pouring into the low-lying areas. Pismennyy probed with his gaze the sheer cliffs along the gorge to his right and left. He felt very tired: he had flown several quite difficult sorties that day. And now he had to overcome his own fatigue -- he did not want his men to notice this.

Finally the helicopters reached the designated area. Dusk was growing thicker in the depressions and crevices. Establishing radio contact with the leader of the assault troop element, Pismennyy determined precisely the points from where the dushman were delivering fire. They dropped a parachute flare. Vyacheslav Mikhaylovich and his wingman pinned the dushman to the ground with helicopter weapons fire, enabling the assault transport helicopter to land safely. The assault troopers had clambered into the helicopter's cargo space before the parachute flare burned out. The helicopter took off, and they all headed back toward the airfield.

Vyacheslav Mikhaylovich flew more than 100 combat missions on Afghan soil. In August 1981 his military labor was honored by award of the Order of the Red

Star, and six months later, by now a lieutenant colonel, he went home on reassignment to one of the interior districts.

Vyacheslav Mikhaylovich endeavored to pass on to his men the know-how and experience he had amassed during his years in the service, organizing their training and indoctrination in the spirit of the demands of modern combat. Soon the collective became one of the best. Pismennyy was elected deputy to the municipal soviet. Together with the other elected representatives of the people, he worked on many important issues dealing with the townspeople's daily lives and served as a spokesman for the men of the garrison, who had elected him as their representative to this popular body.

But Vyacheslav Mikhaylovich could not stop thinking about Afghanistan. He possessed a wealth of experience, which could be fully utilized on Afghan soil.... And Lieutenant Colonel Pismennyy placed a request for transfer on the higher commander's desk.

"I request an assignment...," the officer began to read. "But you have already served almost a tour and a half in Afghanistan," he shrugged his shoulders in perplexity. "And you want to go back?"

"Please don't get me wrong," said Vyacheslav Mikhaylovich, barely containing his emotion, and explained the reasons which compelled him to take such a step.

"We'll think about it. You are also very needed here in the district...."

The senior commander clearly had no wish to let an experienced commander and pilot go, but Pismennyy was adamant, and got his wish.

Vyacheslav Mikhaylovich was entertaining mixed feelings as he arrived at his former garrison, sprawled on a broad, mountain-ringed plateau. Everything seemed familiar, and at the same time things looked strange and different. The Mi-8 helicopter which V. Gaynutdinov had once flown now stood on a pedestal in front of headquarters. A small area dedicated to this intrepid pilot had been set up in the barracks. Vyacheslav Mikhaylovich stood for a time in silence before the neatly-made bed of his famed namesake and read the text of the ukase conferring on him the title of Hero of the Soviet Union and the Minister of Defense order placing him permanently on the squadron's rolls, and realized: he must run the outfit in such a manner as not to do injury to this hero's fame.

...Afghan troops were mounting an operation against dushman bands entrenched in the Panjshir gorge. They needed assistance. Pismennyy and his men were assigned a rather difficult task -- to land a heliborne tactical assault force at a spot high in the mountains to the rear of the rebels. Thorough ground preparation preceded mission departure.

Finally the helicopters were airborne. Lieutenant Colonel Pismennyy sent out ahead a two-ship element to conduct follow-up reconnaissance and target designation, led by political worker Lt Col V. Pshenichnyy. According to the general tactical plan, a strike element was to follow, led by deputy commander

Lt Col N. Lukashev, followed by four helicopters carrying the assault troopers, led by Vyacheslav Mikhaylovich. The follow-up reconnaissance pair spotted the mountain landing site in advance, and the leader radioed back that the landing site was vulnerable to dushman fire from adjacent high ground....

When the combat helicopters approached, the bandits shifted fire to them. They had to return fire. They flew one pass, a second, a third, and then, orbiting, proceeded to cut the bandits off from the landing site. In the meantime the Mi-8s carrying the assault troops had commenced their landing approach.

Pismennyy was the first to set down. He could hear the motorized riflemen clambering down the rungs as they poured out of the helicopter. Running to a point several meters from the helicopter, they took shelter behind rocks and engaged the enemy. The troopers dismounted from the other helicopters just as quickly.

Climbing skyward, Vyacheslav Mikhaylovich and his wingmen hit surviving bandit weapon positions. After successfully accomplishing the mission, he gave the command to break off.

This time not one helicopter was hit by dushman bullets. Unfortunately this was not always the case. There was another occasion when heliborne assault troops were being put down in the mountains. They had "worked over" the landing site, but not all rebel weapons had been neutralized. As usual, Pismennyy was the first down, but he came under intensive fire from a heavy machinegun. His instrument panel was shot up. The main rotor began to vibrate. His tail boom was damaged.... But the commander continued his descent. Fortunately he was still able to control the helicopter. After disgorging his troops, Vyacheslav Mikhaylovich handed over command of the element to his deputy and undertook the very risky venture of getting his helicopter aloft and heading back to base by the shortest route. It was only after he had landed that he became aware that his arms and legs were compeltely numb --a result of the enormous stress and tension. But the worst was behind them. The helicopter was heavily damaged, but it had been saved, and the crew was also out of danger. An inspection of the helicopter revealed more than 10 bullet holes, and at rather critical locations.

On another occasion one of our aircrews had some bad luck. Their helicopter was crippled in the mountains by dushman. A forced landing was necessary, but soon their engines quit, and the craft plunged onto a slope-flanked mountaintop. Taking a squad of motorized riflemen, Pismennyy quickly headed out to the site, accompanied by an escort element. Vyacheslav Mikhaylovich, under intense fire, unhesitatingly landed close to the downed helicopter. The troopers split up into teams: one engaged the bandits, while the other proceeded to make its way toward the damaged helicopter. Although they were being provided air cover by a gunship element, the dushman nevertheless succeeded in damaging Pismennyy's helicopter. Dushman bullets were striking the helicopter's skin with a smacking sound. Incredible self-control, composure and courage were demanded of the aircraft commander and his crew! The copilot-navigator and crew chief returned fire, while Vyacheslav Mikhaylovich monitored engine operation. Finally the motorized riflemen

brought on board the crew of the crippled aircraft and the rest of the troopers. They were able to bring out everybody, but at the cost of enormous effort! On this occasion, as always, Lieutenant Colonel Pismennyy displayed his finest warrior qualities.

On his second tour of duty with the limited Soviet forces in the DRA, Vyacheslav Mikhaylovich flew more than 500 combat sorties, logging more than 400 hours in the air. And almost every mission involved risk to his life. He frequently flew as element leader for various tactical elements, directing the actions of the aircrews in the air knowledgeably and skillfully in the course of flying airstrikes on the rebels and delivering heliborne assault troops. He was always distinguished by boldness and courage, determination and initiative in every situation, regardless of complextiy.

In view of this officer's high level of professional and commander proficiency, his political, professional and moral qualities, higher authorities felt it appropriate to promote him several rungs up from his previous position after Lieutenant Colonel Pismennyy completed his tour of duty in the DRA -- to deputy commander of air forces of the Central Group of Forces. And he is proving worthy of this great trust and confidence, is serving as an example of a genuine party-minded attitude toward his assigned task, and is vigorously implementing the party's demands pertaining to further increasing vigilance and combat readiness and strengthening discipline in the aviation units and subunits of this group of forces.

By ukase of the Presidium of the USSR Supreme Soviet Lt Col V. Pismennyy was awarded the title Hero of the Soviet Union for courage and heroism displayed during performance of his military duty in rendering internationalist assistance to the DRA. In a solemn ceremony the senior-level commander presented him with the Order of Lenin and a Gold Star Medal. He was recently promoted to the rank of full colonel.

...Our interview with Vyacheslav Mikhaylovich was aprroaching an end. I asked him what powerful force was guiding him in the dangerous skies over Afghanistan. His reply was perhaps a bit laconic but to the point: sense of duty. To the armed forces whose orders he was carrying out. To the homeland and its people, for the sake of whom he was risking his life. To the working people of the DRA, who so badly needed the internationalist assistance of friends. To his wife and his two sons, to whom he can look in the eye with clear conscience.

3024
CSO: 9144/044

PECULIARITIES OF WEATHER IN MOUNTAINOUS AREAS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 87 (signed to press 4 Jan 87) pp 19-21

[Article, published under the heading "Flight Safety: Expert Advice," by Maj V. Klepikov: "Weather Peculiarities in Mountain Areas"]

[Text] During a tactical air exercise Capt N. Ryabov, commander of a flight of transport helicopters, was given the mission to deliver ammunition and rations to a landing site high in the mountains. All aircrews successfully accomplished this critically important mission, promptly delivering supplies to the designated site. This enabled a tactical air assault force to hold its positions on a mountain pass until the arrival of the main force.

Upon returning to the airfield, Capt N. Ryabov reported detailed en-route weather conditions to the flight operations officer in the presence of the unit's weather officer. This veteran combat pilot, who had flown many difficult missions, was well aware that information on cloud cover and winds obtained en route would subsequently help ensure flight safety for his comrades.

Practical experience shows that mountain flying involves a number of difficulties caused by the fact that the network of weather reporting stations is rather thin in mountainous areas and that the development of atmospheric processes has not been studied in full detail, which makes weather forecasting difficult. In addition, radar weather reconnaissance capabilities are limited due to the masking effect of mountains. And, finally, the processes of forming of clouds, precipitation and fog take place with particular speed and intensity in mountainous areas.

Mountainous areas exert considerable influence on the displacement and evolution of air masses and weather fronts. This applies to the greatest degree in weather situations involving increase in velocity of vertical air movement (low-pressure systems, low migratory highs and troughs of low pressure associated with weather fronts). Spilling across a mountain range extending east-west, for example, a low-pressure system separates into two independent pressure systems. The worst weather conditions occur above the northern slope of the range. When low-pressure systems are traveling perpendicular to the mountain range, the air mass sets in on the windward

slope, only after which does the center of the low-pressure system on the leeward side of the range proceed to move.

Mountain ranges have little effect on the speed of warm fronts and, as a rule, there is no precipitation on the leeward slope. The higher a mountain range, the greater the effect of diminishing the activity of warm fronts. For example, passage of warm fronts over the Caucasus is accompanied by considerable decrease in cloud cover along the front. Reestablishment of warm fronts deformed in the region of cloud cover during passage across mountain ranges is observed as the front moves away from the mountains. In contrast to warm fronts, cold fronts slow their rate of advance and frequently develop into slow-moving cold fronts along mountain ranges.

Mountain-and-valley wind circulation should always be considered in preparing a weather forecast; this is especially important in aviation weather forecasting.

Mountain-and-valley circulation is observed with low-gradient barometric pressure fields. In conditions of small horizontal pressure gradients, wind gusts blowing up the valley are observed 2-4 hours after sunup. They reach maximum speeds between 1200 and 1400 hours local time. After sunset, following subsequent cooling of the mountain slopes, the wind direction reverses.

As a rule mountain-and-valley circulation does not involve substantial wind shifts. The presence of well-developed mountain-and-valley circulation is a local feature and can be utilized to forecast continuation of good weather for a period of 12-24 hours.

Weather forecasters should devote particular attention to analysis and forecasting of winds during development of low-pressure activity in the vicinity of a mountainous area or during the invasion of a cold air mass into mountainous areas. In this case a low-pressure system is accompanied by a steep pressure gradient with winds gusting to 10-12 m/s, blowing down the valleys. The descending air warms, and the so-called foehn effect occurs on the windward and leeward sides of a mountain range.

A unidirectional foehn should be expected if the mountain range runs perpendicular to wind direction in the troposphere. In these conditions a foen is observed on the leeward side of the ridge.

With steep pressure gradients caused by an approaching low-pressure system, the existence of narrow passages in gorges and valleys can cause an increase in wind velocity to 20-25 m/s, and in certain cases as high as 30-40 m/s.

When preparing an aviation weather forecast, weather unit specialists consider changes in wind conditions connected with deformation of air flow when crossing mountain ranges. Mesoscale wind field disturbances occur if wind velocity is at least 8-10 m/s at the altitude of the mountain range peaks and wind direction does not deviate from perpendicular to the ridge by more than 30-40 degrees. Three types of disturbance connected with crossing mountain

ranges are differentiated, on the basis of vertical wind profile: wave, rotary, and rotary-wave.

So-called leeward mountain waves form during wave disturbance. As a rule they develop when wind velocity increases with altitude above the highest point of a mountain range and air temperature is well stratified (Figure 1). The extent of a leeward mountain wave zone varies from 10 to 100 times mountain range elevation. Vertically such waves can encompass the entire troposphere. Altocumulus lenticular clouds are a good indicator of such waves.

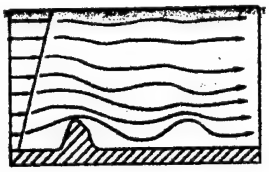


Figure 1. Diagram of forming of a wave disturbance.

The Dorodnitsyn-Skorer parameter can be used as a quantitative indicator for forecasting leeward mountain waves:

$$1\text{-}2 = g\ \text{gamma-a} - \text{gamma} / T\ V\text{-}2,$$

where T -- average air temperature in layer; gamma-a -- adiabatic lapse rate; gamma -- vertical air temperature gradient; V-2 -- average wind velocity component in the layer, perpendicular to the ridge crest.

Parameter 1-2 is calculated by layers at 0.5-1.0 km intervals. Development of leeward mountain waves should be anticipated when parameter 1-2 decreases with altitude. Flying in a leeward wave zone is hazardous due to descending and ascending air currents, the velocity of which can reach 10-15 m/s, and in certain instances as high as 20 m/s.

Leeward wave length lambda (km) with a vertical air temperature gradient of 0.5 degrees C/100 m is determined with the following formula: lambda=0.5 W, where W is the average velocity of the wind component perpendicular to the mountain ridge in the troposphere. Usually leeward wave length is 11 km.

A rotary disturbance (Figure 2, see following page) is observed up to level 2 H (H -- elevation of ridge). As a rule in these instances stratification of air temperature is stable at mountain ridge elevation. As a result of airflow separation at ridge crest height, air vortices form on the leeward side of the obstacle. Flying in conditions of rotary disturbance is always accompanied by heavy buffeting, which diminishes at a distance of 10-15 km from the leeward side of the ridge. Helicopter buffeting usually continues vertically to altitudes exceeding the ridge crest elevation by 1,000 meters.

Rotary-wave wind disturbance forms as a result of the effect of superimposing wave and rotary disturbances (Figure 3, see following page). The vertical profile of a wind component perpendicular to the ridge is characterized by a

maximum in the lowermost layer and subsequent increase in wind velocity with altitude. One can judge the existence of vortices from a vortical cloud extending along the ridge, positioned in the first crest of the leeward wave. With rotary-wave disturbance heavy buffeting of helicopters is observed on the leeward side of mountain barriers, and strong vertical air currents in the air mass above ridge elevation, connected with the forming of leeward mountain waves.

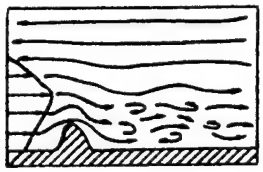


Figure 2. Diagram of formation of rotary disturbance.

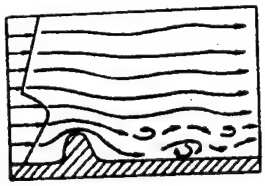


Figure 3. Diagram of formation of rotary-wave disturbance.

Quality of aviation weather forecasting in mountainous areas can be improved first and foremost by making a detailed study of the physical-geographic peculiarities of the flight operations area and aeroclimatic descriptions of air routes on the basis of materials produced by many years of observations in the weather station network. Weather specialists should study in detail an area's orography (directional orientation and extent of mountain ridges and valleys, their elevation above sea level, steepness of slopes, and characteristics of underlying surface).

In order to determine a zone of increased turbulence, one must continuously analyze and synthesize pilot reports of moderate and heavy buffeting in relation to winds and weather conditions. This will help weather forecasters pinpoint flight operations areas in which local circulations may develop.

In order to become acquainted in detail with the physical-geographic peculiarities of air base and flight operations areas as well as flying and weather conditions at different times of the year, it is essential that weather specialists tour the base operations area by transport aircraft and helicopter.

The possibility of abrupt weather changes in mountain areas and insufficient density of the weather station network impose greater demands on organization and conduct of airborne weather reconnaissance. In order to make it more effective, one should map out airborne weather reconnaissance routes in advance, tailored to type of weather situation. The availability of such a diagram enables weather briefers to take part efficiently and knowledgeably in formulating weather reconnaissance flight assignments according to the current weather situation.

3024
CSO: 9144/044

SQUADRON DEPUTY COMMANDER FOR POLITICAL AFFAIRS FLIES HELICOPTER IN AFGHANISTAN

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 87 (signed to press 4 Jan 87) pp 22-23

[Article, published under the heading "The Squadron -- Center of Ideological Indoctrination Work," by Lt Col N. Antonov: "Flight Leader's Duty"]

[Text] A tactical air exercise was in progress. The helicopter squadron commanded by Gds Lt Col A. Firfanov was to execute a night insertion of air assault troops in the "enemy's" disposition area. The mission was complicated by the fact that the helicopter crews had to penetrate an air defense zone. Nor was the weather helping: high, gusty winds could make maneuvering difficult.

The aircrews refined and detailed the situation at the preflight briefing. Soon the helicopters headed out toward the destination. Skillfully maneuvering, the pilots penetrated the air defense zone and delivered the assault troops on schedule.

The men of the squadron received high marks on the exercise. It was noted that the helicopter crews had performed smoothly, with precision, and with great enthusiasm. The crew of the subunit's deputy commander for political affairs, Gds Maj A. Staroverov, was named among the top performers.

"Outstanding!" the higher commander exclaimed at the post-mission debriefing. "You performed like in real combat."

Analyzing the results of the tactical air exercise, one can reach the following conclusion: success was achieved in large measure due to the excellent aggressive spirit prevailing in the subunit. It was a result of planned, orderly, purposeful activity on the part of commanders, political worker, and party organization.

A party meeting was held in the squadron on the eve of the tactical air exercise. Those who spoke mentioned personal exemplariness by Communists in combat training, revealed shortcomings, and criticized lagging individuals. Guards Major Staroverov subsequently emphasized in his statements that each and every flight should not only provide a certain sum total of knowledge and

skills but also develop solid morale, staunchness, and readiness to act in emergency situations.

"First of all we must do away entirely with unnecessary situation simplification and relaxation of demands," he stated. "What good are excellent marks on training sorties which would be impossible in an actual combat situation? And how can one bear the title of vanguard performer knowing that mistakes were made due to lack of pilot proficiency and violation of military discipline?"

The political worker raised important questions, suggested ways to solve problems, and focused party members toward aggressive actions. This had an immediate effect on practical deeds. The tactical air exercise can also be considered an illustration of the effectiveness of his work.

Of course it is formed not merely from statements at meetings and from discussions. Incidentally, Aleksandr Ilich does not like to talk a lot. His fellow soldiers -- superiors and subordinates -- unanimously note that Staroverov does not utter empty words. Before reaching a decision, he figures and calculates all factors involved. But subsequently he never disclaims responsibility or attempts to shift responsibility to somebody else. Is this merely taking cognizance of the times? Very likely not. When a serious discussion was held in the collective on restructuring of consciousness and all one's activities, there were many people who were psychologically ready for this, who became generators of a complex process, so to say. These people included Aleksandr Ilich.

His path into aviation was uncomplicated and not at all unusual. As most boys, he liked reading books and hearing stories about pilots and fierce aerial combat. Many had lost their special enthusiasm for this by the 10th grade, but he still had it, and it grew into a firm desire to become a pilot. After completing school he enrolled in the Syzran Higher Military Aviation School for Pilots.

There were no professional military men in Aleksandr's family. His father, Ilya Ivanovich, went to work at an aircraft plant during the war and worked there his entire life. He worked as a sheet-metal worker, riveter, and as a foreman. His mother, Anna Tikhonovna, worked at a factory as a stitching machine operator. His brother Vladimir was a truck driver. This future military pilot had seen from childhood the work-calloused hands of his father and mother and had heard them talk about a worker's honor, the beauty of labor, and faithfulness to one's chosen profession. And everything Aleksandr did, whether it was studying theoretical subjects, mastering practical flying skills, or doing volunteer work, he did it reliably and conscientiously.

He served in various aviation units after graduating from service school. He worked his way up from copilot-navigator, helicopter commander, to senior helicopter commander. During those years his efficiency reports always read: "...Always calm and composed, does not lose his presence of mind in a difficult situation, enjoys the professional respect of his colleagues."

His fellow soldiers repeatedly elected him to the party buro. And Staroverov engaged in party work in a thoughtful and serious manner. Back when he was a flight and squadron party activist he already clearly understood that trust and confidence are not gained by appeal or flattering phrase. He therefore always approached people with an open heart, without guile, always calling a spade a spade. It was at his initiative, for example, that they began approaching with greater demandingness the determination of winners in socialist competition. He enlisted young aviation personnel to set up a combat glory room, and he organized a camera enthusiast group.

Aleksandr Ilich liked working with people. And when the command authorities offered him the position of squadron deputy commander for political affairs, he agreed without hesitation. One cannot say that Staroverov's development as a political worker proceeded entirely smoothly. There were mistakes and setbacks. He lacked skills in political indoctrination work, and he did not have enough time to do everything. But he learned from his older comrades and fairly soon was doing a solid job.

When Aleksandr Ilich reported to his new duty assignment, he already possessed a fair amount of work experience as a squadron deputy commander for political affairs. He soon was familiarized with his new job and became acquainted with the men. Most of the pilots were young, but many of them had already taken part in such large-scale exercises as "Zapad-81" [West-81]. And on the whole the subunit had a good reputation in the unit. The squadron commander, Gds Lt Col V. Bulatov, was considered one of the most experienced methods experts and indoctrinators. He and the deputy commander for political affairs established a good professional and personal relationship. They were unaware at the time that they would be facing harsh ordeals. They had no inkling, but they prepared themselves and their men to act in the most diverse situations, in conditions approximating actual combat.

As he examined things in the subunit, working with the men, Aleksandr Ilich noted with alarm that some of the young pilots clearly overrated their own abilities. Upon earning a commendation for performance in an exercise, a young pilot might decide that he had already acheived a certain summit in combat expertise and would become lax in training and performance of job duties. Staroverov saw that the young men were making a large number of mistakes. Gds Lt A. Terekhov, for example, sometimes displayed excessive self-assurance, and yet he showed rough edges in training mission calculations.

Staroverov shared his observations and conclusions with the squadron commander and with party buro secretary Gds Maj M. Zemlyakov who, incidentally, had served a tour of duty with the limited Soviet forces in the Democratic Republic of Afghanistan and possessed combat experience. They backed up the political worker. Together they devised a plan of action.

First of all they would plan and schedule training drills with special attention devoted to calculating individual elements of the training sortie and the navigator's work sequence. The squadron commander and flight commanders began grading training flights more strictly. They increased demandingness on the pilots as regards effectiveness of maneuver, accuracy of

bombing and rocket/missile firing, and cleanness of flying technique. The party organization also made a contribution toward improving the level of training of combat pilots. At its recommendation party members M. Zemlyakov, Yu. Kornaukhov and others shared their experience and know-how with the younger pilots. The party buro monitored training progress. It stepped up socialist competition on tasks and performance standards and set up regular publication of visual propaganda materials.

During this period Guards Major Staroverov had plenty of work to do. He was helping the squadron commander organize training activities, attending party buro meetings when party members presented progress reports, and was constantly working with the men. He devoted a good deal of attention, for example, to Gds Lt A. Terekhov. Aleksandr Ilich saw that the young pilot had gained a great deal from special training. But the political worker set a task for himself -- to achieve a turnaround in his consciousness. Staroverov had numerous talks with this officer, noting the strong and weak points of his character and working to influence them. As an older comrade, he gave advice and suggested a solution to various problems. He won over the young pilot with his sincerity and forthrightness and became an example for him in attitude toward military duties and daily activities -- in short he became a close friend with whom one can share one's joys and sorrows. Aleksandr Ilich got this officer to begin assessing his every action with a high measure of responsibility and from a strict ethical and moral position. And as we know, this forms firm moral principles and the psychology of the Soviet citizen, defender of the homeland.

This is only one example of purposeful, persistent individual indoctrination work by Guards Major Staroverov. There were also others in the squadron who required no less attention. And Aleksandr Ilich worked with each man just as conscientiously, blazing a new trail each time, and in most instances achieved his objective.

The next end-of-training-period performance evaluation showed squadron personnel's increased combat skill, the degree of maturity of the collective, and its ability to accomplish difficult tasks. But soon Staroverov was faced with an even tougher test, this time not at a tactical exercise but in the skies over Afghanistan.

Staroverov did not give an immediate reply to the question: "What do you recall most of all during this period of your military service?" He thought for a while, and then said: "My first encounter with an unfamiliar land, with unfamiliar people, my first days in Afghanistan, when I was overwhelmed by the newness of external sensations and when an inner, psychological restructuring was taking place."

These were indeed difficult days. Waiting for the first sorties, an unaccustomed environment, exhausting heat, some foul-ups with living conditions, missing one's family and familiar surroundings -- all these things interwove and kept people in a state of tension. They needed help. The commanding officer and deputy commander for political affairs first of all set up regular training activities. Aircrews worked on mastering flying in new and unaccustomed conditions. The men trained hard and assiduously. Aleksandr

Ilich endeavored to get the men together fairly often, related to them the specific features of flying in mountainous areas, and related the exploits of those pilots who had been here before them, such as Heroes of the Soviet Union V. Gaynutdinov, V. Shcherbakov, recipient of the Order of Lenin V. Surtsukov, and other heroes of the Afghan skies. He spoke about the honorable internationalist mission which had fallen to the lot of Soviet airmen. Here in the DRA he attached even greater importance to individual work with the men.

But it would probably be incorrect to picture a political worker engaged only in talk and discussion. Aleksandr Ilich remained true to his principle: reinforce words with deeds. He saw that the men were tired and needed rest, recreation, and good food. With the support of the commanding officer, Staroverov got better living conditions and better food for the men, got the airmen supplied with the necessary clothing items, and got a bathhouse constructed. Subsequently, also with his active participation, they obtained additional equipment for the technical personnel shack and set up a training classroom. As could have been expected, this had the best effect on the men's level of job proficiency and mood. The pilots and technicians worked enthusiastically and rapidly acquired the essential knowledge and skills.

Combat operations commenced. Well trained and prepared crews, both professionally and in a moral-psychological respect, went out on missions. This affected the quality of performance of combat missions and helped avoid unwarranted losses. Officers S. Drovosekov, V. Popov, A. Terekhov, and many others repeated displayed a high degree of skill, boldness and resourcefulness in a difficult situation. The commanding officer and his political worker displayed an example to their subordinates. It was they who flew the most difficult missions, frequently as a two-ship element.

Taking a vigorous pummeling, the dushman [Afghan rebels] did not risk daylight attacks on towns and villages or supply convoys. But at night our pilots frequently responded to alerts.

Such was the case on this occasion as well. Bandits had attacked a military convoy. Immediate assistance was needed. The aircrews of Gds Lt Col V. Bulatov and Gds Maj A. Staroverov responded.

They flew in darkness, on instruments. As they approached the designated area they could see fires burning off in the distance: fuel tanker trucks were aflame. They established radio contact with the convoy. The people on the ground informed them where the dushman fire was originating. Bulatov streaked in to attack, with Staroverov providing cover. He saw flames erupting from the lead helicopter as it fired rockets. Tracers arced upward toward them from the mountain slope. When the commanding officer had broken off, Aleksandr Ilich hit the bandit position in a shallow dive.

They flew another pass, attacking another weapon position at the edge of a village. Extreme accuracy and precision were required here, for otherwise the enemies of the April Revolution and their sponsors would raise another campaign of lies about allegedly innocent victims or someting of the ilk. Staroverov took careful aim. He fired off a salvo. Plumes of flame from the

bursting rocket warheads erupted at the point where they had seen the DShK [Soviet-made heavy machinegun] muzzle flashes.

The helicopters flew two passes over the convoy -- there was no more dushman weapon fire. "Ground" thanked the airmen for a job well done.

Once they flew out to pick up a wounded soldier. Bulatov was to put down on a spot the size of a dime, while Staroverov was to provide cover. As soon as the wheels of the leader's helicopter touched down, bandits entrenched in the mountains opened fire. What were they to do? The helicopter and its crew were in danger. But they could not simply fly away: a wounded man was waiting for help. And Aleksandr Ilich made the only correct decision: he proceeded to fly attack passes on one dushman weapon position after another. Aiming on their muzzle flashes, he hit them with rocket salvos, while his crew chief delivered machinegun fire. Since Staroverov's helicopter presented the greatest threat, the bandits concentrated fire on it. Their tracer bursts arced to the right and left of the helicopter, and it was only the pilot's flying skill which saved them from a direct hit.

At this critical moment of combat they ran out of ammunition. At this point Aleksandr Ilich proceeded to feint attacks, to keep the dushman off balance. In the meantime Bulatov took the wounded man aboard. A flight of Mi-24s then appeared overhead, and proceeded to finish off the bandits.

Guards Major Staroverov has logged hundreds of combat missions. This officer has been awarded the Order of the Red Star. Both in the air and on the ground he has always endeavored and continues to endeavor to act in such manner as to have the full moral right to demand of his subordinates: "Do as I do!"

In the combat glory museum of the unit in which Aleksandr Ilich presently serves there is a photograph of him and other pilot-internationalists. Many of them are wearing combat decorations. This subunit is presently one of the regimental leaders. But the airmen are continuing to study hard, the veterans help the newcomers, and the squadron has become a genuinely close-knit, unified collective, with a strong, militant party organization. It would seem that everything is fine. But the main thing which distinguishes the men of this squadron is a frank, firm assessment of past achievements, a lack of complacency, constant and continuous quest, striving toward new heights, new summits of achievement in combat expertise. Officer-political worker A. Staroverov focuses the guards airmen toward these goals.

3024
CSO: 9144/044

PILOTS VIOLATE FLIGHT SAFETY RULES AND PROCEDURES

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 87 (signed to press 4 Jan 87) pp 26-27

[Article, published under the heading "Flight Safety: Experience, Analysis, Problems," by Military Pilot 2nd Class Maj B. Kononenko: "Not for the Sake of Going Through the Motions"]; discussion of article "The Sky Does Not Forgive Mistakes"]

[Text] I read with great interest the article by squadron commander Lt Col V. Antyufeyev entitled "The Sky Does Not Forgive Mistakes." I can understand the author's concern with the fact that certain pilots in the subunit under his command commit violations of flight rules and regulations. And this naturally adversely affects the state of combat readiness and military discipline as well as the moral atmosphere in the collective.

In connection with this the matters pertaining to flight safety addressed in the article are important cause for concern, for this problem of great national importance requires constant attention on the part of commanders, political workers, party and Komsomol organizations, and all airmen without exception.

During my tours of duty in various air-force garrisons I have encountered a fair number of sundry violations of flight safety rules and regulations. The overwhelming majority involved a lack of personal discipline on the part of flight personnel. And I must also state that some air mishaps and mishap-threatening situations could have been avoided. I have therefore decided to share my thoughts on this score. I shall discuss flight discipline.

The criteria of expert flying are strict. The road to flying expertise is difficult and thorny. Only that combat pilot who is distinguished by an indomitable desire to achieve more in his combat proficiency and who respects the rules and regulations of flying can accomplish this journey with honor. Complacency and excessive self-assurance, however, inalterably lead to a gradual loss of skill and to violations of the requirements of guideline documents which regulate mishap-free flying.

Why am I saying this? The fact is that some pilots even try to justify certain violations of flying procedures discipline, claiming that they are

endeavoring to improve their level of flying skill. For example, in order fully to accomplish the objectives of a training sortie and to avoid lagging behind their comrades in combat training, at times not only young pilots but veteran combat pilots as well deliberately ignore flight rules and regulations and act contrary to common sense. I should like to give such pilots a comradely warning against these mistakes. I shall state quite frankly that overestimating one's ability and counting on luck have never led to success. The truth resides where elements of any training flight are accomplished with a full guarantee of flight safety.

I had the following experience. After refining and detailing the necessary data on a mock combat sortie, flight commander Capt V. Anikonov and I climbed aboard the aircraft. The Fire in Port Engine warning light suddenly flashed on for a moment on my panel during engine runup. I immediately informed the aircraft commander of this. Captain Anikonov reasoned as follows: if the warning light were correct, the crew chief would have certainly spotted smoke and flame and would have given the signal to shut down engines. But the latter was unperturbed.

"We'll taxi over to the quick-check area," the aircraft commander informed me over the interphone. "We'll check it out there."

The same warning light came on and stayed on when we did another engine runup. But the quick-check area officer gave no indication that anything was wrong. The flight commander, however, correctly assessing the situation, reported the incident to the flight operations officer.

We taxied over to the centralized fueling point and shut down our engines. It took the maintenance people only a few minutes to determine the reason for the warning light flashing on. It was ascertained that just prior to flight operations the crew chief, in checking out the system, had reversed warning system polarity and had slightly displaced the switch terminals. Therefore when the engine throttles were in a certain position the warning circuit closed.

The problem was quickly corrected. Nevertheless time had been lost, and we were unable to fly the scheduled mock combat sortie.

I mentioned this incident because something similar happened to young pilot Sr Lt V. Pavlov. His actions, however, were entirely the opposite to those of Capt V. Anikonov.

I shall note right at the outset that the pilot received only a mark of satisfactory on executing the maneuver sequence in the practice area. Pavlov made mistakes in maintaining altitude, bank angles, and rate of turn. The flight commander determined all this from the flight recorder tapes. In reply to the question why he had diverged from standard parameters, the senior lieutenant tried to justify his performance by complaining that his fighter had not been in proper weight and balance. The flight commander asked Pavlov what comments he had made to the aircraft technician after the flight. When he learned about the warning light, everything became clear. During the

flight it had distracted the pilot from his practiced procedure of distributing his attention among the instruments.

Analyzing his subordinate's errors, the flight commander noted his lack of personal discipline and failure to observe the requirements of documents governing flight operations, and in particular the regulation which prescribes specific actions by crew members in such a situation.

Just what caused the pilot to ignore rules and regulations? The answer is simple: a desire to complete the flight training assignment that day at all costs, in order not to fall behind his colleagues. This misdeed was severely but fairly censured in the squadron. Senior Lieutenant Pavlov was grounded until he was able to pass the appropriate qualification tests. He was also severely taken to task by the Komsomol organization.

We could end the discussion on this if violations of this kind occurred only with those who are just beginning their aviation career. As I have noted, however, rather experiecned pilots also do such things. Here is an example.

As he was taxiing out onto the runway, officer A. Vasilchenko felt that his nose gear was not responding well to left pedal and was turning too abruptly when he applied right pedal. Nevertheless he reported to the flight operations officer that everything was working properly, and he took off.

Since he was an experienced pilot, after touchdown he made proper compensation for the problem during rollout. But when he tried to turn off the runway he discovered that the nose gear refused to respond to the pedals. Continuing to roll straight ahead, the aircraft, its engines shut down, came to a stop at the end of the runway. By the time a tow vehicle had driven out and towed him off to safety, fighter-interceptor takeoffs and landings had fallen behind schedule.

And yet prior to takeoff this pilot could easily have properly analyzed the situation and made the correct decision: to report the situation to the control tower and then respond to the instructions of the flight operations officer. there is no doubt that this would have been in the general interest and in the interest of flight safety. The aircraft's nose gear problem would have been corrected in a prompt and timely manner.

There is no question about the fact that today a great deal is being done to ensure flight safety. And therefore a determined campaign against instances of lack of discipline in the air is particularly essential.

Precisely this is the procedure now not only in the flight in question but in the squadron and unit as well. Efforts are being made to step up preventive work among flight personnel. Principal attention is being devoted to instilling in combat pilots discipline and a sense of responsibility for accomplishing flight assignments and for making thorough preparation for training flights. Individual talks are held with the pilots, and some of them are summoned to a meeting of the party buro to present reports on observance of the requirements of guideline documents governing mishap-free flight operations. Flight and squadron commanders have also increased their

demandingness and monitoring of the actions of their subordinates. The experience and know-how of combat pilots who have done a particularly fine job during a flight operations shift is regularly synthesized and publicized at their initiative. Flight safety violations of any kind are now discussed and analyzed without delay, and the guilty parties are held strictly to account. These and other measures are producing gratifying results.

Flight operations are inconceivable without precise, mandatory observance of all pertinent rules and regulations. They have been tested and proven by many years of practical operations and a wealth of experience amassed by generations of airmen. And wherever proper attention is paid to these rules and regulations, there are no air mishaps or mishap-threatening situations, and airmen show a higher degree of combat skill.

3024
CSO: 9144/044

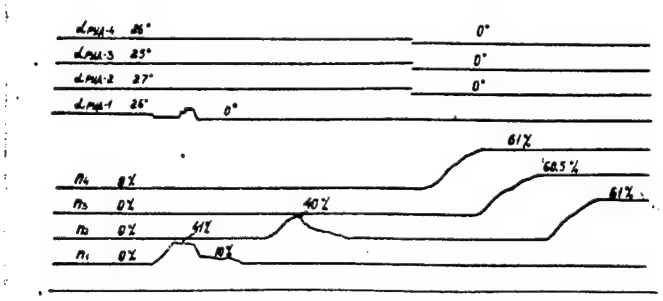
FAULTY STARTUP PROCEDURE DAMAGES TURBOPROP ENGINE

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 87 (signed to press 4 Jan 87) pp 26-27

[Article, published under the heading "Mastering a New Aircraft," by Lt Col P. Karpenko and Candidate of Technical Sciences Lt Col Yu. Kuzmin: "Negative Transfer of Habit"]

[Text] It happened when firing up the engines on a transport aircraft in a certain aviation unit during a period of conversion-training over to new equipment. WO V. Zhdanov, who was handling ground communications with the aircrew, noted sparks coming out of a turboprop engine exhaust. They shut down the engine on his orders. An inspection by maintenance personnel revealed damage to the final turbine stage, and they found particles of metal in the turboprop exhaust nozzle. The engine had to be taken out of service. What was the reason for what had happened? After all, an experienced aircrew had fired up the engines, with the participation of senior flight technician Capt A. Lysov, a highly proficiency-rated specialist who was type-rated on several different military transport aircraft. A panel of inquiry headed by the unit's deputy commander for aviation engineer service was to come up with an answer to this question.

First of all it analyzed the flight data recorder tapes (Figure 1). Analysis of the tapes established that just prior to starting the engines, the throttles had been set above idle.



Engine startup record on data recorder tape.

Startup of the number 1 engine had been performed at a throttle setting of 26 degrees, while the throttle setting was at 27 degrees during startup of the number 2 engine.

During number 1 engine startup, when engine speed reached 41 percent, rpm stopped climbing and subsequently dropped to 10 percent. Specialist personnel shut down the engine 30 seconds after the malfunction became evident.

Startup of the other engine was also unsuccessful, but it was shut down immediately after reaching 40 percent rpm.

After two unsuccessful attempts to start engines, all four engines were throttled back to idle. Subsequent engine startups, except for the first one, which had shot sparks and flame out the exhaust, proved normal.

An analysis confirmed that the mistake had happened through the fault of the senior flight technician, Capt A. Lysov.

A typical feature of the startup procedures for the turboprop engines with which the officer had previous experience is capability manually to adjust fuel flow with a control button. This is done in order not to exceed maximum allowable exhaust gas temperature during engine startup.

The engine startup process is fully automated on the new transport aircraft, and manual adjustment is not required, which provides a reliable, assured engine startup regardless of external conditions, in an optimal time, without excessive exhaust gas temperature.

In performing engine startup, Capt A. Lysov incorrectly set the throttles of all four engines. For this reason at the moment of cutout of the starter, which was turning the engine rotor, the process in the combustion chamber was not at the proper point, as a consequence of which the power developed by the turbine was insufficient to continue spinning the engine rotor. This resulted in rotor rpm "hanging."

This one mistake made by the senior flight technician resulted in another. Noting that turbine speed was not increasing, Lysov advanced the throttle, and then, seeing a rise in the exhaust gas temperature, throttled down to reduce fuel flow. But it was too late.... Without understanding the reason for his failure to start up the number 1 engine, he immediately attempted to start up number 2.

Turbine spinup once again "hung" at 40 percent, but this time the officer promptly shut down the engine.

Only after his second failed attempt did he make the right decision: he throttled back to idle.

It was noted at the critique and analysis session, conducted with engineer and technician personnel, that as a result of many years of experience Captain Lysov had formed firm habits in working with engines on which adjustment of

fuel flow during startup was prescribed. This was the reason for his mistake. The automatic system used on these engines provides the possibility, as it were, for incorrectly setting the throttle above idle, and therefore the system incorporates an engine startup throttle interlock. These habits were not fully corrected or differentiated in the process of conversion-training over to the new equipment. Thus this was a case of negative transfer of habit.

Subsequent training sessions took cognizance of the possibility of continuity of earlier-acquired and newly-forming habits in operating the equipment. Special attention was focused on the fundamentally new design of systems performing similar functions on aircraft of different generations. Thorough study of these specific features and the ability flawlessly to apply them in practice have helped specialist personnel knowledgeably and proficiently operate new aircraft.

3024
CSO: 9144/044

HELICOPTER GUNSHIP PILOT TAKES CRIPPLING FIRE IN AFGHANISTAN

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 87 (signed to press 4 Jan 87) pp 28-29

[Article, published under the heading "Into 'Heirs of October' Competition," by Maj V. Zhitenev: "Born for the Sky"]

[Text] Sergey Filipchenkov's path into aviation was a normal one as was the case with many other boys his age. As a schoolboy he read with great excitement books about aviators -- fighter pilots, helicopter pilots, bomber and transport aircraft crews. Sergey made a firm decision to become a military pilot. What was hard was making a specific choice of air component [fighters, bombers, etc]. Ultimately the youth chose helicopters and traveled to Saratov. After passing the entrance examinations and acceptance by the credentials board, he was awarded his cadet's shoulder boards. His training began. He made his first parachute jump, soloed, and did a tour of duty in a line unit, where the future helicopter pilots were passed on experience and know-how by high proficiency-rating combat pilots. Everything proceeded well. Filipchenkov's efficiency report on completing service school read: "...He has mastered the curriculum well, and is very willing to share his knowledge with his comrades. He likes flying, and flies well. He always prepares fully and conscientiously for flight activities."

As one of the top graduates, Lieutenant Filipchenkov was assigned to one of the leading aviation units. Intensive combat training began, to which community-service workloads were added -- the squadron's Komsomol members elected Sergey secretary of their organization. It was necessary to justify his comrades' faith and confidence with a vigorous work effort. Filipchenkov realized that the main thing for the young pilots was to master their equipment and to prepare to conduct combat operations in VFR and instrument weather, day or night. And he also always bore in mind that as a Komsomol leader he must constantly stand up as an example. He therefore endeavored to perform all flight training assignments well. During his years of development as a combat pilot he recalled with gratitude the instructors back at service school, who had provided him with solid knowledge of theory and had taught him to operate a helicopter in a competent manner.

At that time Sergey's comrades in arms already saw in him a heightened pilot's awareness and were confident that he would not waver or let them down even in the most dangerous situation.

Senior Lieutenant Filipchenkov reported for duty with a subunit serving with the limited Soviet forces in Afghanistan with considerable knowledge and experience. By this time he had joined the party, become an aircraft commander, and had successfully passed the examinations for the rating title of military pilot 2nd class.

This military airman-internationalist was called upon to fly various kinds of missions. On one mission, for example, while flying air cover to protect a convoy against dushman [Afghan rebel] attack, he knocked out a rocket launcher and killed its crew. The next time out Sergey, without the slightest hesitation, streaked to the assistance of his element leader, saving the latter's aircrew from sure death.

That same day they were flying air cover for an Afghan-force heliborne assault. Barely had the helicopters commenced hovering above the small landing zone when bandit heavy machineguns lying in ambush proceeded to pour fire at them. The element leader's helicopter took a burst. The controls jammed, and the helicopter proceeded to hover in place, becoming an immobile target. Every second counted. But seconds were sufficient for Filipchenkov to execute a steep dive and provide his commanding officer with cover. The dushman became confused, turned their machineguns toward the attacking helicopter, but it was too late. The helicopter delivered every bit of firepower it had and knocked out the weapon position. Soon a new decoration appeared on the chest of this intrepid pilot -- the Order of the Red Star.

Sergey Filipchenkov had no inkling at the time that the most serious and difficult ordeal still lay ahead.

Another day of flight operations began well for his crew: the helicopter crewmen provided effective support to combat actions by Afghan troops and returned safely to base. But they were not given much time to rest. One of the crews was assigned the mission of evacuating Afghan wounded from the battlefield, while Filipchenkov's two-ship element was to provide air cover for the evacuation helicopter.

Skillfully maneuvering above the mountain terrain, the helicopters proceeded toward the designated area. Pilots in command officers M. Kadyrov and and S. Filipchenkov closely scrutinized the terrain below.

"On the mountainside over there to the right -- dushman," the element leader's voice came over the radio. "Do you see them?"

"Affirmative," replied Sergey, adding: "On the slopes and on the summit."

"Let's get 'em. You hit the ones on the right."

Sweeping into a turn, the helicopters headed swiftly toward their targets. Gleaming bursts of machinegun fire arced upward. But the helicopters did not

veer from their target heading. The helicopters pulled out of the dive and swung around for a second pass. Suddenly there was a large explosion at the left side of Filipchenkov's fuselage. The craft shook violently, as if it had come into hard collision with a sheer rock face. The pilot was knocked back in his seat. His eyes grew dim. There was a burning smell in the cockpit. The altimeter and airspeed indicator had failed, and there was a problem with the fuel pumps. The helicopter was being buffeted like a farm wagon along a bumpy road. Filipchenkov, firmly grasping the cyclic stick, applied rearward pressure by force of habit. The stick would not budge.

"Sasha, help me!" he shouted over the interphone to his weapons officer. "Can you hear me?"

There was total silence. In the meantime the helicopter was steadily losing altitude, and it seemed that it would no longer be possible to bring it back to level flight.

The ground was approaching rapidly. Exerting an incredible effort, Sergey finally succeeded in halting the descent. The helicopter came level and then slowly began gaining altitude.

"Sasha! Mironov! Can you hear me?!" Sergey shouted over the interphone from time to time....

The element leader, Major Kadyrov, was also not responding. The situation was critical. The pilot was not even able to determine his airspeed.

In the meantime Kadyrov, discovering that his wingman had fallen behind, swung around and approached him.

"What is the problem? Report your situation," he radioed.

Sergey radioed a brief sitrep.

"Follow me," the element leader ordered.

As they were approaching the airfield, the pilot attempted to lower his gear, but the landing gear refused to extend.

"Request permission to make a belly landing," he radioed.

"Go ahead," the tower replied. "Good luck...."

The helicopter slowly descended. Filipchenkov worked the cyclic stick and collective with the last of his waning strength. When the rotor blades proceeded to blow up clouds of yellow dust, he was forced to sense distance to the ground intuitively, and put the helicopter down on its belly.

A fire engine and ambulance were standing by. Airmen were running toward the craft. Comrades dragged him out of the cockpit. He proceeded away from the helicopter and sat down on the ground. Only then did he feel the leaden

weight of his body.... Sr Lt A. Mironov had been killed aloft -- most of the fragments had pierced the weapon operator's canopy.

The recommendation to award S. Filipchenkov a decoration read: "For exemplary performance of missions, displayed courage, heroism and exceptional composure in a difficult, critical situation during performance of his internationalist duty in the Democratic Republic of Afghanistan, he is worthy of award of the title Hero of the Soviet Union."

Similar words were written during the tumultuous war years in recommendations for decorations to be awarded to the bravest servicemen. Capt Sergey Filipchenkov, who is distinguished by a strong feeling of responsibility, is a worthy successor to these brave men. Also attesting to this is the fact that Hero of the Soviet Union Capt S. Filipchenkov was one of the first to arrive at Chernobyl when the disaster occurred. Sergey Viktorovich flew numerous runs to the crippled reactor. He flew into the danger zone until the doctors forbade him to continue. This also was a most difficult ordeal, which this young party member passed with flying colors.

* * *

From the editors: As this issue was about to go to press, we learned that Capt S. Filipchenkov had been elected as a delegate to the 20th All-Union Komsomol Congress. We should like to offer sincere congratulations to Sergey Viktorovich. We wish him every success!

3024
CSO: 9144/044

NEW BOOK ON ROOTING OUT RELIGION, SUPERSTITIONS IN MILITARY PERSONNEL

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 87 (signed to press 4 Jan 87) pp 30-31

[Review of book "Razum Protiv Religii: Voprosy Ateisticheskogo Vospitaniya Sovetskikh Voinov" [Reason Against Religion: Aspects of Atheistic Indoctrination of Soviet Servicemen] by K. A. Payusov, published under the heading "Atheistic Indoctrination of Servicemen": "'Reason Against Religion'"; Moscow, Voyenizdat, 1986, 126 pages, 20 kopecks]

[Text] In conditions of a most acute ideological confrontation between socialism and capitalism, imperialist propaganda is waging a furious offensive on the minds of Soviet citizens and is attempting to discredit the achievements of genuine socialism. In addition to propaganda agencies, "Soviet studies" institutions and organizations, the imperialist states extensively utilize a tested and proven ally -- the church.

Catholic, Protestant, Muslim, and Jewish churchmen form a united front with imperialist reaction in the struggle against the forces of peace and progress. Far-reaching political objectives lie concealed behind their words about defense of religion, ethics and morality, and the rights of the church against atheism: to blacken and besmirch Marxism-Leninism, to instill pacifistic attitudes in Soviet citizens, and to achieve the ideological and moral erosion of the socialist society. A new book entitled "Reason Against Religion" persuasively tells how this is being done, and also discusses the tasks of atheistic indoctrination of Soviet servicemen. This book is published by the Military Publishing House of the USSR Ministry of Defense [Voyenizdat].

The author lays forth the harm caused to people by various religious sects and exposes the actions of subversive imperialist centers which use religion in the struggle against the socialist countries. The Communist Party devotes considerable attention to dissemination of scientific-materialist views and atheistic indoctrination of Soviet citizens. The author cites a statement in the CPSU Program to the effect that the party utilizes means of ideological influence to accomplish broad dissemination of a scientific-materialist world view and to overcome religious prejudices, while taking pains not to hurt the feelings of religious believers. While advocating strict observance of the constitutional guarantees of freedom of conscience, the party condemns attempts to use religion to the detriment of the interests of society and the

individual. A most important component part of atheistic indoctrination is increasing people's labor and civic-effort activeness, educating and enlightening them, as well as extensive dissemination of new Soviet ceremonies and customs.

The author emphasizes that presently not all ministers of religion and religious preachers have a loyal attitude toward the Soviet system. As we know, such persons can be found in the religious organizations of the "Initiativist" baptists, Jehovah's Witnesses, Pentecostalists, and "True "Orthodox Christians." They attmept to implant nationalistic attitudes and call upon the faithful not to take part in sociopolitical affairs, to refuse military service and, in particular, to refuse to serve in the Air Forces, claiming that flying in the heavens angers God.

The members of some religions still consider military service "committing a sin." Among young conscripts one still encounters boys who have been brainwashed by religious preachers, who refuse to acknowledge their duty to the homeland and the obligation to defend it with weapon in hand. The author demonstrates with persuasive examples that religion in large measure hinders a person from becoming a full-fledged defender of the homeland. Religious prejudices have a harmful influence on the volitional qualities of a serviceman, on his military training and on his performance of job duties connected, for example, with flight operations support, maintaining an airfield in exemplary condition, etc.

The author emphasizes that the feeling of confidence which sometimes arises in persons on the basis of religious views or superstitions is far from sound. With the slightest situation change it turns into confusion and panic. Soldiers who lack confidence in their ability grounded on knowledge and experience sometimes become flustered and give up if they experience a sudden loss of faith in supernatural help, evoked by a change in circumstances or loss of "salutary" charms or talismans, even in a training environment.

The author cites the following incident. In a certain aviation unit a pilot, upon being given a flight assignment, suddenly became confused and shot a perplexed look toward his superior. This did not escape the notice of the higher commander, who demanded an explanation. It seems that the pilot had left at home his lucky charm -- a little stuffed bear that he always took along when he flew, in the belief that it would protect him against any bad luck. One can easily imagine what could have happened if he was in the air when he discovered that his lucky bear was missing. As we know, flying a modern combat aircraft demands a high degree of concentration and self-control of the pilot, and the slightest confusion or becoming flustered while aloft can lead to an air mishap.

Unfortunately, the author notes, some commanding officers and political workers assume that atheist indoctrination should be conducted only with persons who believe in God. They do not consider persons holding various superstitions to be religious believers, and they tend to take lightly the fact that some military personnel believe in lucky charms, are afraid of the number 13, etc. This is a mistake. Belief in God and superstitions are one

and the same -- faith in supernatural forces. Religion is to be found wherever there is faith in the supernatural.

The author points out that "spiritual shepherds" make skillful use of instances of lack of attention on the part of certain commanding officers and political workers toward those military personnel and the members of their families who are experiencing grief and who are in a state of depression for an extended period of time. Here is an example.

The widow of a pilot who was killed was left with the couple's two children. There was no longer any laughter or loud conversation in the home. The thought that her beloved husband was gone forever was more than she could bear. It is a terrible thing suddenly to be alone at the age of 32.... What about the children? They were small and incapable of fully understanding the situation. What about her husband's friends? They attended the funeral and expressed their condolences, but subsequently they became wrapped up in their busy lives. But there was the constant presence of her religious-believer neighbors. They spoke heartening words about an afterlife, where she would rejoin her husband. These "brothers and sisters in Christ" always found time to visit the widow, to talk to her, and little by little dulled her senses with the opiate of religion. The grief-stricken widow began to be drawn toward preachers, began reading the Bible, and subsequently attended a religious service. Only after this did the deceased pilot's comrades give thought to his widow and help her break the fetters of religion.

The idea that atheist indoctrination in the Armed Forces is not some separate part of ideological work which is limited to overcoming religious prejudices runs through the author's entire narrative. Atheist indoctrination pursues the task of educating military personnel -- forming a scientific world view, communist ethics and morality, a conscientious attitude toward military labor and duties as prescribed by regulations, a feeling of Soviet patriotism, proletarian internationalism, and other moral-political, psychological and fighting qualities essential to ensure a high degree of combat readiness on the parts of units and subunits.

The party teaches us that there is no place for neutrality or compromises in the struggle between a scientific and a religious world view. The 27th CPSU Congress demanded that ideological cadres and all Communists "wage an aggressive campaign against bourgeois ideology and morality, against anti-Soviet acts of provocation and ideological sabotage by imperialism, against attempts to utilize religion for antisocialist purposes."

The author seeks persuasively to present that harm which religious prejudices can do to servicemen's awareness of their constitutional duty to defend the socialist homeland, the forming of excellent moral-political, fighting and psychological qualities in military personnel, and he endeavors clearly to show how these carryovers and superstitions, reinforced by pacifistic recommendations, impede one from performing one's duties in an exemplary manner. He considers systematic presentation, continuity and a comprehensive approach, which ensures unity of such indoctrination with political, military, moral, and aesthetic indoctrination to be an essential condition for effectiveness of atheist propaganda. Toward this end he recommends the

extensive utilization of all forms and means of dissemination of scientific atheism: question-and-answer evenings, reader conferences, lectures, discussions, and other activities.

This book also contains recommendations to commanders, political workers, party and Komsomol activists on atheist indoctrination of personnel and uses interesting and persuasive facts to demonstrate the positive experience amassed in this area in military units and subunits. This book will unquestionably be greeted with considerable interest on the part of Air Force readers and propagandists.

3024
CSO: 9144/044

FIGHTER BASE GROUND LOGISTIC SUPPORT PERSONNEL SEEK IMPROVED JOB PERFORMANCE

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 87 (signed to press 4 Jan 87) pp 32-33

[Article, published under the heading "Socialist Competition: An Acceleration Factor," by Lt Col P. Stepanov: "Objectively Comparing Results"]

[Text] The men of the airfield technical support unit in which Maj B. Platonov serves have a great deal of work these days. The men always keep the complex airfield equipment and facilities in good working order. Working hard and persistently to improve their knowledge and hone their skills, they are seeking to honor in a worthy manner the 70th anniversary of the Great October Revolution and the 20th All-Union Komsomol Congress with additional successes. Positive changes are taking place in the collective in connection with the process of perestroyka [restructuring] which is in progress. The command authorities and party organization are doing everything possible to reinforce these changes and to make them irreversible. The airmen are guided in this important activity by statements made by Comrade M. S. Gorbachev, General Secretary of the CPSU Central Committee, that it is impossible today to live and work, think and act in the old manner and that without restructuring it is impossible to accomplish the tasks advanced by the 27th CPSU Congress.

Considerable attention here is devoted to accelerating intensification of the training and indoctrination process, prompt and timely accomplishment of adopted socialist pledges. Party members Capt R. Lyamushkin, Sr Lt A. Marchenko, and other aviation rear services specialist personnel are working at full effort. They are providing high-quality support to flight operations shifts, alert duty and tactical air exercises, and are campaigning aggressively to meet individual and combined performance standards and to achieve thrift and economy.

Not only a high degree of proficiency but also constant competition between companies, platoons, and services help the airmen successfully accomplish their difficult tasks. The commanding officer, political worker Maj V. Terentyev, and the party and Komsomol organizations devote constant attention to it. A persistent campaign to achieve further increase in vigilance and combat readiness, excellent knowledge of and conscientious maintenance of weapons and military equipment are the principal contents of competition. Healthy competition serves as a powerful force for acceleration in achieving

excellent results in the men's training and indoctrination. They regularly total up socialist pledge fulfillment results, seek out in a prompt and timely manner reserve potential for increasing the effectiveness of competition among specialist personnel, and seek new forms of work competition among the men.

Until recently, for example, the subordinates of officers Yu. Kurasov and A. Marchenko essentially made the same pledges as other specialist personnel. They worked to achieve further improvement in the level of technical sophistication and to achieve consistent end results. At a general meeting of the subunit at the beginning of the new training year, however, the men resolved also to initiate a campaign for excellent maintenance of special-purpose and transport vehicles. Toward this end they drew up a statement of rules and designated a panel of judges to help the command authorities objectively determine winners. This competition is producing impressive results: there has been an increase in the number of excellent-rated individuals, there has been a significant decrease in number of violations of traffic rules and regulations, and quality of motor vehicle operation and maintenance has improved.

At the most recent totaling of results, a pennant and challenge award, which are presented to competition right-flankers, were given to the motor transport support company commanded by Sr Lt A. Marchenko. Advanced know-how was discussed in detail not only at a meeting of personnel but also in wall newspaper articles. At the initiative of the party organization, party members R. Lyamushkin, V. Fisher, P. Luchkov, and other vanguard performers told about and demonstrated to the younger men how they had achieved good results in performance of job duties and in meeting socialist pledges.

The job duties of the men of the unit headed by party member V. Zlobin are varied, complicated, and difficult. The men continuously maintain runways, taxiways, and airfield access roads, and supply aircraft with fuel, lubricants, and replacement parts. In order objectively to demonstrate the results of the military labor and competition by the specialist personnel of this outfit, we shall discuss as an example a night flight operations shift for which they provided support services.

Maj V. Zlobin received from fighter regiment headquarters a request to provide flight operations logistic support. This officer decided to deploy his men and equipment in order to accomplish the assigned task with excellent quality and at lowest cost. Leader-Communists V. Zlobin, B. Platonov, and others discussed with the officers and warrant officers how best to organize flight operations support and competition for excellent flight operations shift results.

Maj B. Platonov then communicated to the flight-line detail, vehicle drivers and other specialist personnel their tasks for the flight operations and a logistic support schedule. Officers V. Terentyev, Yu. Spichkin, Yu. Kurasov, party and Komsomol activists took active part in organizing socialist competition among aviation rear services personnel. In the course of presenting the men's work tasks, they analyzed objectively and in detail mistakes and errors in servicing previous flight operations. Individual socialist pledge fulfillment results were scrutinized and compared. Vanguard

specialist personnel and competition right-flankers spoke to the young servicemen, sharing their experience and know-how. Party buro member Maj V. Terentyev had a discussion with the vehicle drivers on the topic "Leninist principles of socialist competition and the tasks of personnel in the campaign to honor the 70th anniversary of the Great October Socialist Revolution in a worthy manner."

All necessary resources arrived at the airfield at the designated time. Soon intensive work commenced at the aircraft flight-line positions. The tow vehicle drivers also swung into action. Towing fighters to the active, they rigorously observed proper routing and speed.

An objective analysis of logistic support services was conducted after the flight operations shift. Competition results were summarized. The commanding officer, political worker, party and Komsomol activists synthesized the advanced know-how in flight operations servicing on the part of party members A. Marchenko, R. Lyamushkin, V. Fisher, and other veteran specialist personnel. Objectively comparing work and competition results, the commander commended many of the men and called upon his men to continue in the future maintaining a high degree of aggressiveness and stick-to-itiveness in work competition, in effective and high-quality support services for air, weapons, and tactical training of the regiment's flight personnel.

In order better to accomplish the task, skillfully to deploy party and Komsomol activists, optimally to distribute manpower and resources, and to provide for all needs, the unit's command authorities endeavor thoroughly to study the extent and nature of a forthcoming flight operations shift and its specific features. Leader-Communists make sure that they discuss things with the squadron commanders and political workers, with the regiment's deputy commander for aviation engineer service, and thoroughly study the flight operations schedule. In the process of these get-togethers they determine in detail what specialized vehicles and equipment are needed in what sequence, as well as the manner and procedure of efficient equipment operation. A meeting is held with the officers and warrant officers responsible for specific areas, at which the unit's commanding officer and political worker thoroughly brief them, explain how best to organize servicing of sorties, how to deploy activists more efficiently, and how to synthesize, publicize and adopt advanced know-how more promptly and efficiently.

In briefing the vehicle drivers of the airfield maintenance company, for example, Maj B. Platonov focused particular attention on the manner, procedure, and rules of organizing work activities on the basis of flowcharts, rigorous follow-through, and close coordination between individuals and subunits.

Special attention is devoted to training and preparing young specialist personnel. As we know, their breaking-in period is the most critical training phase. The unit's officers value each and every minute of training and endeavor to utilize each minute with maximum effectiveness. This is fostered by precision planning and scheduling of the training and indoctrination process. When he proceeds to draw up a schedule, for example, Maj B. Platonov first schedules classes in the principal subjects and endeavors to ensure that

his men are constantly adding to their knowledge. A principle which generates optimal end results is rigorously observed in training the men -- the principle of gradual transition from the simple to the complex, stage-by-stage forming of job skills.

Success in training the men also became possible because good training facilities were established in the subunit. The specialized training classroom was set up in conformity with the complexity of the equipment to be operated and maintained. It contains unique operating units and mechanisms, wired display stands and models which graphically show the physical processes taking place in the various units and assemblies during operation, as well as the sequence in performance of various operations in servicing and maintaining the equipment and facilities assigned to the specialist personnel.

This makes it possible appreciably to increase the effectiveness of each training class, helps the young rear services specialist personnel more rapidly master skills in servicing, maintaining and operating motor transport and other specialized equipment, and helps improve the methods preparation of leader personnel. Particular attention in the unit is devoted to increase in the officers' methods skills. Methods briefings are held regularly, dealing with the topics to be covered at forthcoming training classes. At such a briefing session officers work on mastering modern training and indoctrination methods, acquire skills of working with individuals, and receive specific recommendations on planning the conduct of training classes. Officer-leaders give presentations on the most difficult topics. Maj B. Platonov and others teach the subordinate officers by personal example how to organize and conduct classes on a high methodological level.

Nevertheless classroom study is only the initial phase of training. Aviation rear services specialist personnel require not only thorough knowledge of theory but also the ability to work on the equipment. This is why party member Platonov devotes almost two thirds of training time to practical training classes and drill sessions, into which they make it a point to introduce elements of competition. This makes it possible more efficiently to develop in the men solid skills in proficient operation and maintenance of airfield equipment during operation shifts.

Seeking to accelerate intensification of the training and indoctrination process, the unit's leader-Communists work at training sessions and special tactical drills, in addition to matters pertaining to rear services support of flight operations, on instilling in their men faithfulness to the military oath of allegiance, discipline, efficiency, fortitude, courage and resourcefulness, and comradely mutual assistance. They devote particlar attention to competitiveness in accomplishing tasks and meeting performance standards. The principal indicator of combat work performance -- its effectiveness and quality -- is defined today precisely in tough competition to determine who will do it better and faster. In the process of restructuring, party members V. Zlobin, B. Platonov, V. Terentyev and others have begun taking more into consideration an additional facet of competition: the endeavor not only for oneself to move forward, but also to pull along a lagging comrade.

Having adopted restructuring as a goal, personnel are engaged in active search in the main areas, in order to find and use as quickly as possible additional reserve potential for improving the quality of specialized, technical and tactical training. Importance is attached to the squads, crews, and platoons, where success is essentially created. It is precisely at this level that a spirit of competitiveness is born, and the campaign by airfield technical support specialist personnel to improve operational efficiency and combat readiness takes on the greatest specificity and purposefulness. At this echelon each individual is in full view of his superior, and each man is performance-graded for his actions in the process of servicing flight operations. There is a possibility of more frequent and objective totaling of performance results, securing publicity and comparability of results of training and competition.

An effective form of organization of such competition has been established in the collective -- volunteer reports by specialist personnel on meeting socialist pledges. This is a typical distinctive characteristic of restructuring, which helps increase competitiveness among personnel as well as their responsibility for the results of their labor and overall activation of the human factor. Now those who have pledged to become an excellent-rated individual or proficiency-rated specialist but who have not yet done so, those who are not truly pulling for the common success are held more strictly to account.

Constantly concerned with publicity to competition, the people in this outfit endeavor to assess the subunit's achievements and deficiencies in a more demanding and objective fashion, because for some people success means a step forward, while for others it means merely marking time. Efforts are also made to observe the following rule: do not remain enclosed within the boundaries of a given military occupational specialty. This approach provides a clearer idea of the interdependence between crews and the role of each man in attaining consistent end results.

Objective comparability of results and extensive competition publicity help develop in airfield technical support personnel an incentive to contribute to the success of the outfit and a feeling of responsibility for meeting pledges. Party members V. Terentyev, P. Luchkov, R. Lyamushkin, and others display an example of conscientiousness.

They have also firmly adopted here the practice of regular talks with the company commanders. One of the staff officers is assigned in advance the task of studying in detail the state of affairs in a given subunit. This results in a specific and objective discussion and, as a rule, the talk helps improve organization of the training and indoctrination process and helps increase effectiveness of competition. In particular, we have succeeded in achieving to-the-letter adherence to the schedule of training activities. The officers show greater responsibility for quality and effectiveness of training and practice drills as well as for strict adherence to the daily routine.

The party buro keeps an eye on every party member. Members periodically report on the work they have accomplished on a given matter. Special attention is focused on objectivity in appraising successes and miscues on the

part of subordinate personnel. All this serves as a powerful incentive for the men to gain a greater feeling of responsibility for examplary performance of job-related duties.

Not all officers and warrant officers, however, are equally active and purposeful in speeding up the training and indoctrination process. There still exists reserve potential for increasing their methods skills, potential which should be placed in the service of combat readiness. In particular, a larger contribution toward boosting the pedagogic level of the subunits' officers and toward training of all personnel could be made by the specialist personnel of the services, who still seldom conduct training classes in their own subject areas.

All this attests to growing pains in improving the training process and to insufficient demandingness on the part of the headquarters staff, which should be monitoring the participation of each and every aviation rear services specialist in the campaign to meet individual and group competition pledges. Nor has the party organization done everything to ensure that the specialist personnel of the services do not remain concentrated solely within the boundaries of their specific technical problems. Activation of this most highly-skilled category of personnel offers an appreciable reserve potential for speeding up the outfit's movement forward.

A great deal more could also be done by the specialist personnel of the services toward practical adoption of advanced know-how. As we know, a great many useful things are born in the course of competition, which could be successfully utilized to intensify the training process. The authors of innovations, however, sometimes have great difficulty in overcoming inertia and lack of comprehension, for example, of the effectiveness of adopting a given efficiency innovation proposal, etc. It also still sometimes happens that advanced know-how finds no followers even in that subunit in which it was born.

One additional item. It is very important that the best methods experts are convinced that their zeal will definitely be noticed and adequately appreciated. It is also necessary to concern oneself with how better to utilize training facilities.

Of course the unit also has other problems as well, which will require considerable work in order to achieve successful resolution in the interests first and foremost of high-quality accomplishment of training schedules and achievement of adopted socialist pledges.

Painstaking, purposeful, hard work lies ahead for the command authorities and party organization, the goal of which was clearly defined at the 27th CPSU Congress: all leader personnel should constantly bear in mind their high degree of responsibility to others at this critical moment of restructuring.

3024
CSO: 9144/044

1930'S SOVIET PILOTS GAIN COMBAT EXPERIENCE IN CHINA, MONGOLIA

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 87 (signed to press 4 Jan 87) pp 34-35

[Article, published under the heading "Tactics and Simulation," by Military Pilot 1st Class Col Yu. Kislyakov and Candidate of Military Sciences Col (Res) V. Babich: "Development of Air-to-Air Combat"; part 2 of three-part article]

[Text] In the Skies Over China and Mongolia

The first air-to-air combat engagement in the skies over China took place on 21 November 1937. Seven fighters flown by volunteers engaged a force of 20 Japanese aircraft. They shot down two bombers and a fighter.

Our pilots in China flew I-15 and I-16 fighters, the performance of which had been tested and proven in the skies over Spain. The Japanese flew I-95 and I-96 aircraft. A comparison of the performance characteristics of these aircraft indicated that the opposing sides were flying comparable machines. The Japanese I-95 sesquiplane, powered by an 800 horsepower motor, had a maximum speed of 350 km/h and could climb to an altitude of 5,000 meters in 6.5 minutes. The I-96 monoplane, powered by a 530 horsepower motor, had a maximum speed of 390 km/h and could climb to 5,000 meters in 6 minutes. Both aircraft were armed with two 7.7 mm machineguns. Thus the former (even externally) was comparable to the I-15, and the latter to the I-16. Since the two opposing sides were flying comparable equipment, tactics and "competition" between schools of aerial combat became the primary factor.

The characteristic features of the Japanese school were clearly evident in the manual of the Imperial Japanese Air Force. It stated that keeping the initiative and freedom of action constitutes a guarantee of success in aerial combat. The entire system of training a fighter pilot should focus on developing independence and a feeling of responsibility for one's actions. Combat should not be initiated at a lower altitude than that of the adversary, with the exception of those instances when one could count on success by attack with the element of surprise or when it was absolutely essential to commence the attack. The end result of a contest between fighters is achieved by capability to maneuver, which is determined by altitude and dive momentum advantage over the adversary, the pilot's skill, and the aircraft's maneuver characteristics.

Japanese pilots tended toward swift maneuver and the simplest maneuver, and if possible avoided complex maneuvers. They practiced standard combat maneuvers to a state of automatism.

On the whole the tactical foundation of the Japanese school of aerial combat did not depart from "world standards." There were appreciable differences, however, in that part where man "was present." The elite Japanese fighter pilots enjoyed special privileges, although they did not always demonstrate in air-to-air combat their right to elite entitlement. Individualism was clearly emphasized in the Japanese manual of fighter tactics. "Group combat," it stated, "consists of a sum total of 'clashes,' the outcome of which is determined by individuals."

We should note at this point that in the first Soviet manual, written in 1923, the "factor of common efforts," not the "factor of the individual combat pilot," was considered the principal element in multiple-aircraft aerial combat. Each pilot should subordinate his actions primarily to the interests of the group, executing the will of his superior, who chooses the direction and moment of the main attack. Collectivism did not, however, repudiate a high level of individual fighter pilot proficiency, just as it did not repudiate one-on-one aerial combat.

The combat practices of our pilots in China aimed at gaining the element of surprise included utilizing weather, attack out of the sun, feints by secondary elements, as well as ground-waiting ambushes set up at staging airfields in the area of the defended installation or on approach routes to it. An alert warning system based on forward observation posts was employed in order rapidly to get into attack position. The principle of economical expenditure of manpower and resources was acknowledged.

During the period of most intensive combat operations, the Soviet command authority devised a plan for repulsing a massed Japanese air attack. More than 100 I-16 and I-15 aircraft were secretly concentrated in the Hankow area. On 29 April 1938, at approximately 1000 hours, after receiving warning from observation posts, the squadron led by group commander Capt A. Blagoveshchenskiy took off first, followed by the other squadrons.

According to the battle plan, the I-16s climbed to an altitude of 5,000 meters, while the I-15s climbed to 4,000 meters. The more highly-maneuverable I-15s, flying evasive oblique weaves, kept the enemy's escort fighter cover busy, while the high-speed I-16s engaged in vertical-maneuver combat. The I-16 squadron led by Lt N. Zingayev penetrated into the corridor which formed, sweeping on in and attacking the first 9-ship Japanese bomber element. The element leader and his wingman were shot down. The two trailing 9-ship elements of twin-engine aircraft dumped their bombs prior to reaching the battle line and turned back. A reserve element proceeded to engage in pursuit. Exploiting its superior speed, this element caught up with and shot down several more aircraft.

Soviet pilot N. Kozlov describes this air battle as follows: "The enemy bombers were flying in a solidly-packed vee formation of 9-ship elements. The

fighters, bearing solid-red circles on their wings, were positioned higher and to the side.

"A portion of our forces swept straight toward the fighters and engaged them. The bulk of our force hit the bombers. Arcing lines of tracers crossed and intercrossed. Aircraft, attacking and breaking off attacks, flashed before our eyes. Tongues of flame were now creeping along the fuselage of several bombers. But the enemy continued with samurai tenaciousness in his attempts to penetrate through to the target. Crippled, out-of-control aircraft were plunging earthward in disarray. But those remaining aloft, closing formation, were spewing lead with all their machineguns. One must give credit where credit is due: the enemy aircrews showed a high degree of proficiency -- one could sense the conditioned toughness of elite officer cadres. An aircraft would be aflame, but would continue maintaining position off the leader's wingtip, and would remain under control and firing machinegun bursts until the crew was killed."

The Japanese lost 21 aircraft. The Chinese lost two. Sr Lt G. Kravchenko shot down two bombers in this engagement.

As is evident from the description of this aerial engagement, in which more than 50 aircraft on each side took part, our fighters employed tactics taking into account the "Spanish" experience. This experience prompted the disposition of fighter forces (a mixed or composite formation) and the sequence of their engagement, as well as the logic of battle, taking into account the adversary's strong and weak points. Understandably the plan was devised by pilots Col P. Rychagov and Col G. Zakharov, who had gained combat experience in Spain; Zakharov himself executed the battle plan.

At the same time our bombers were also perfecting aerial combat tactics. On 3 August 1938 three SB aircraft, flown by pilots Sr Lt A. Kotov, Lt V. Anisimov, and Lt S. Slyusarev, bombed a Japanese bomber assembly depot in Anqing. After departing from the target they were overtaken by a pair of I-96s, which took an attack position 100-150 meters below them to the right rear. The aerial gunners beat off their attack with heavy defensive fire. Enemy reinforcements arrived, however. Eighteen Japanese fighters attacked the three SBs from different directions. The bombers proceeded to climb, flying shallow turns (S-turns), providing mutual cover. This tactic prevented the Japanese fighters from attacking from above, while the aerial gunners fought off their attacks from below.

One I-96 nevertheless succeeded in coming up alongside the bomber on the flank, restricting the latter's horizontal maneuvering. The rest of the fighters, individually taking up position in the blind spot under the horizontal stabilizer, tried to attack at point-blank range. The aerial gunners, however, were able to shift from the top machinegun turrets to the hatch-mounted machineguns and provide mutually-supporting fields of fire. The Soviet aviators' practiced coordination deprived the adversary of any hope of success. The deadly chase went on for 50 minutes. The persistent but less than proficient Japanese attacks resulted in the loss of 4 Japanese aircraft.

After the three SB bombers landed, from 20 to 70 bullet holes were counted on each of the aircraft. Conclusions were drawn from analysis of the combat engagement fought by the three against 18 aircraft: the basis of bomber defense in aerial combat is a close formation with close fire coordination (according to the principle of "protect your neighbor's tail"); combat tactics should take into account the strong points of one's aircraft (in this case the excellent high-altitude performance characteristics of the SB); do not allow the adversary to exploit your weaknesses (if attacked from above, gasoline fumes would ignite from the very first incendiary round, while rounds fired from below would extinguish in cold gasoline); rehearse rapid shifts of formation in order to concentrate fire in the direction of an imminent enemy attack.

Night aerial combat also experienced further development in China. It was ascertained following a thorough study of the adversary's behavior that on their routes of flight Japanese pilots made use of linear illuminated reference checkpoints and flew at medium altitudes. A defensive plan was drawn up taking these specific features into account. Our pilots divided the area through which enemy aircraft flew into combat air patrol zones and specified a patrol procedure which incorporated altitude-stacking. Practice flights were made for the purpose of strengthening instrument flying skills and testing organization of night operations. Searchlights were employed for the first time in a combat support role.

...Pilot Lt A. Dushin spotted a flight of Japanese bombers proceeding toward him in the second combat air patrol zone along the enemy's route of flight. The Soviet pilot executed a maneuver, placing himself 25-30 meters from the enemy wingman in a favorable attack position. The latter burst into flames from the accurate fire and fell to earth 30 kilometers from the Chinese airfield.

After losing several more aircraft in night combat, the Japanese stopped flying at night.

The Chinese newspaper JIEFANG RIBAO reported at that time that the Soviet pilots who had volunteered for service in a China engulfed in the flames of war had by their fearless actions boosted the fighting spirit of the Chinese people.

The coveted title Hero of the Soviet Union was awarded to 14 Soviet pilots who had defended the skies over China.

The first air-to-air combat in the skies over Mongolia was fought on 22 May 1939. A 5-ship Soviet fighter element encountered over Khamar-Daba Mountain five Japanese aircraft which had intruded across the border. Both sides lost one aircraft apiece in this engagement.

Soon the 22nd Fighter Regiment (63 I-15 and I-16 fighters) arrived in the Mongolian People's Republic from the Transbaykal Military District, followed by the 38th Bomber Regiment (59 SB bombers). A group of pilots with combat experience arrived from Moscow on 29 May. They included 17 Heroes of the Soviet Union. Immediately after their arrival they dispersed among the

various airfields and proceeded to train flight personnel without combat experience. Our air forces were based close to the combat zone, and an air observation, warning and communications service was set up. Preparation for combat was conducted on the basis of the experience obtained in Spain and China.

One month after the first engagement with border-intruder aircraft, 95 Soviet fighters engaged 120 Japanese aircraft almost simultaneously in three different areas. Elements of I-16 and I-15 aircraft adhered to a tactical variation based on tactics which enabled them to exploit the weaknesses of the Japanese I-95 and I-96 fighters. That same day 34 enemy aircraft were shot down, while Soviet losses totaled 14 aircraft and 11 pilots. Two days later, on 24 June, the enemy lost an additional 16 aircraft. Two I-15s failed to return from battle.

The Japanese tried to compensate for the substantial losses they had sustained in multi-aircraft air-to-air engagements by flying surprise strikes on Soviet airfields. On the morning of 27 June, for example, 23 enemy bombers and 70 fighters took part in strikes on the dispositions of the 22nd Regiment. The Japanese executed a bypass maneuver at low altitude and suddenly swung in toward the airfield. The warning of air attack came late, as a result of which the scrambling Soviet pilots engaged under disadvantageous conditions. The enemy also succeeded in reaching with the element of surprise the airfields of the 70th Regiment, thanks to a raiding party which was able to cut the telephone lines linking the airfield with forward observation posts.

Our Air Force command authorities learned from this bitter lesson, which cost 17 aircraft destroyed. Steps were immediately taken to increase the survivability and ensure uninterrupted operation of the warning system. This made it possible to gain time for engaging fighters and pushed intercept points further from the airfields. This was immediately reflected in air battles fought on 4, 5, and 8 July, in which a total of 45 enemy aircraft were shot down (Soviet losses totaled two I-15s and one I-16).

The scope and intensity of fighter combat operations steadily grew. Several squadron missions were flown each day. Frequently from 90 to 100 aircraft would take part in a single engagement.

Combat events were in full swing when an order was received naming Hero of the Soviet Union Maj S. Gritsevets commander of a special group, which was to test in combat the new Soviet I-153 fighter, dubbed the "Chayka" [seagull] because of the gull-like break in its upper wing. It had a more powerful engine and retractable landing gear, which meant greater speed, improved maneuverability, and a higher rate of climb. After checking out and flight familiarization with the "Chayka" and practice combat, the group headed out on an actual mission.

...As usual, the Japanese were superior in maneuver. Taking the "Chayka" to be the familiar I-15, they proceeded to close. Gritsevets decided to employ a military stratagem: the "Chayki" swung back, feinting withdrawal. This maneuver counted on superior speed, which enabled them to control distance to the enemy. Hoping for an easy victory, the Japanese proceeded to pursue.

After allowing them to approach to a safe distance, Gritsevets gave the command, and all Soviet aircraft simultaneously executed a sharp 180 degree turn, reversing direction. The Soviet aircraft attacked head-on. The enemy, not expecting such a turn of events, broke formation. Single aircraft breaking away from the formation were shot down. The Japanese lost four aircraft in this engagement. The effect of bringing the new aircraft into combat was obvious.

We should state that the new Japanese I-97 fighter, introduced to combat for the first time, was no suprise to our pilots. Intelligence which had been obtained on it neutralized the element of surprise. As S. Gritsevets recalled, the practical experience from the combat operations in Spain was carried through -- the smooth coordination of combat formation flying and the endeavor not only to defend but to attack as well were fully retained....

For their courage and valor as well as the highest degree of flying skill while rendering internationalist assistance to the fraternal Mongolian people, 23 pilots who saw action in the skies over the Mongolian People's Republic were awarded the title Hero of the Soviet Union, while Yakov Smushkevich, Grigoriy Kravchenko, and Sergey Gritsevets became the first to be twice awarded the title Hero of the Soviet Union. (To be concluded)

3024
CSO: 9144/044

COMPUTING COMBAT MANEUVERING WITH PROGRAMMABLE ELECTRONIC CALCULATOR

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 87 (signed to press 4 Jan 87) pp 36-37

[Article, published under the heading "The Pilot and the Computer," by Military Pilot 1st Class Maj V. Dovbnya and Military Pilot 2nd Class Maj V. Teryayev: "Combat Maneuvering with the Programmable Microcalculator"]

[Text] The fighter-bomber, taking concealment behind terrain irregularities, streaked toward the target. The ground was in very close proximity, and Lt A. Ivanov directed his entire attention to looking for the reference checkpoint. The stopwatch hand indicated that the calculated time was past, but he had not spotted the checkpoint. Suddenly the bend in the river appeared, above which he had to initiate the maneuver to strike his point target. In order to maintain the predetermined strike time, the pilot lit the afterburner, put his aircraft into a chandelle, and proceeded to look for the target. Ivanov spotted it, but far to the side of his attack run. He was unable to deliver the strike as planned back at the base.

It was ascertained at the post-mission debriefing that the pilot had failed to maintain conditions of chandelle entry and, in addition, in the process of searching for the target he had failed to monitor maneuver parameters and did not know the configuation for the altered conditions of maneuver entry. This happened because he had made calculations only for a single strike variation and had failed to plot a model of the entire flight, especially the target attack maneuvers.

Experience indicates that thorough, careful simulation or modeling makes it possible to carry out mission assignments with a high degree of precision. For example, comparison of the parameters of the model with the flight data recorder tapes makes it possible to pinpoint not only errors in piloting but also maximally to utilize the aircraft's maneuver capabilities and to increase flight safety.

As we know, modeling a flight includes three phases: determination of the elements of the flight and sequence of their execution, calculation of the parameters of flight maneuvers and their analysis, and comparison of calculated parameters with actual results based on the flight data recorder tapes. Direct and inverse problems are solved when modeling a flight. In the

first instance a trajectory of motion of the aircraft's center of gravity is plotted according to the preselected flight configuration, and in the latter -- an optimal flight configuration for the preselected trajectory is chosen.

How is a direct problem solved in performance of horizontal and vertical maneuvers? Maneuvers and flight elements are specified in the mission assignment. One must begin determining maneuver parameters with control functions. For execution of maneuvers in a horizontal plane the pilot specifies control functions, altering engine thrust and G force in the maneuver. For practical calculations it is expedient to represent n-y = f(v) and n-x = f(V) graphically (Figures 1 and 2).

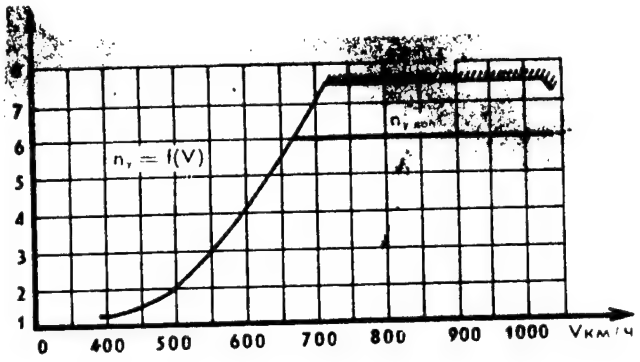


Figure 1.

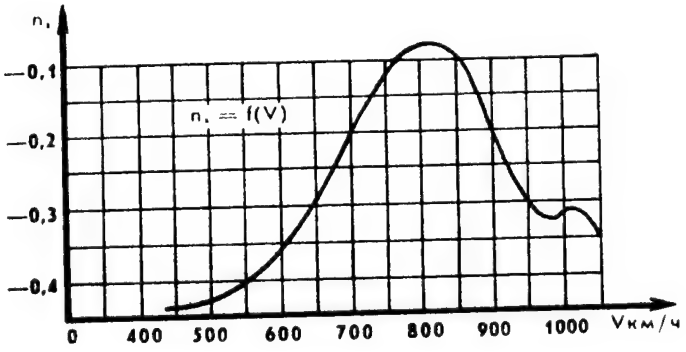


Figure 2.

If the control function is specified, the problem clearly boils down to numeric integration of differential equations:

$$\delta V_i = g n_{xi} \delta t;$$
$$V_i = V_{i-1} + \delta V;$$
$$V_{cp} = (V_{i-1} + V_i)/2;$$
$$\omega_{zi} = \frac{\delta \varphi_i}{\delta t} = \frac{g}{V_{cp}} \sqrt{n_y^2 - 1};$$

$$\delta\varphi_i = \omega_{ai}\delta t \cdot 57{,}3;$$

$$r_{ai} = \frac{V_{i\,sp}}{\omega_{ai}}.$$

In order to increase accuracy of calculation, the principal parameters of a banked turn are determined on the basis of average airspeed for each integration step. The parameters of the maneuvers can be analytically calculated manually by points, but these operations are performed more accurately and faster with a programmable microcalculator (PMK). Figure 3 contains a diagram of an algorithm for calculating the parameters of a 360 degree nonsustained turn.

$$\delta t = \frac{V_{i-1}}{g(n_{yi} - \cos\Theta_i)}\delta\Theta_i;$$

$$\delta V_i = g(n_{xi} - \sin\Theta_i)\delta t_i;$$

$$r_{yi} = \frac{V_{i-1}^2}{g(n_{yi} - \cos\Theta_i)};$$

$$\delta H_i = V_{i-1}\sin\Theta_i\delta t_i;$$
$$V_i = V_{i-1} + \delta V_i;$$
$$H_i = H_{i-1} + \delta H_i.$$

Figure 3.

Key: 1. Start; 2. Input; 3. Result; 4. End

The calculation program, using a type MK-54, MK-56, or MK-61 PMK is as follows: (see following page)

```
00.ИПА 01.ИПС 02.× 03.9 04.· 05.8
06.1 07.× 08.П1 09.ИП0 10.3 11.· 12.6
13.÷ 14.П2 15.ИП1 16.+ 17.П6 18.ИП2
19.+ 20.2 21.÷ 22.П1 23.ИПВ 24.FX²
25.1 26.— 27.F√ 28.9 29.· 30.8 31.1
32.× 33.ИП1 34.÷ 35.П3 36.ИПС 37.×
38.5 39.7 40.· 41.3 42.× 43.П4 44.ИП1
45.ИП3 46.÷ 47.П5 48.ИП6 49.3 50.·
51.6 52.× 53.П0 54.С/П 55.БП 56.00
```

Program instructions:

1. F PRG; enter program; F AVT; V/O.
2. Enter input data: Vo (km/h) into P0 register; delta t (s) into PC register.
3. Load p-xi into PA register; p-yi into PB register.
4. S/P; calculation results, step i: Vi (km/h) into X and P0 registers; delta-phi into P4 register; r-zi into P5 register.
5. To calculate banked turn parameters in next step, jump to 3.

As an illustration, the following table contains calculated data on a nonsustained banked turn for initial airspeed V=750 km/h and the control functions depicted in Figures 1 and 2.

Table

№ шага	V_i (км/ч)	n_{xi}	n_{yi}	$\delta\varphi°_i$	$\varphi°_i$	r_{zi}(м)	Примечание
	750	—0,13	6,0		0		Начальные условия $\delta t_i = 1$ с
1	745,4	—0,14	6,0	16,01	16,01	743,27	
2	740,46	—0,145	6,0	16,11	32,12	733,83	
3	735,34	—0,155	6,0	16,22	48,34	723,92	
4	729,86	—0,162	6,0	16,34	64,48	713,56	
5	724,14	—0,175	6,0	16,46	81,14	702,70	
6	717,96	—0,185	6,0	16,60	97,74	691,24	
7	711,43	—0,195	6,0	16,75	114,49	679,11	
8	704,54	—0,21	6,0	16,90	131,39	666,41	
9	697,13	—0,22	6,0	17,08	148,47	653,02	
10	689,36	—0,24	6,0	17,26	165,73	638,95	
11	680,88	—0,26	6,0	17,47	183,2	624,06	
12	671,70	—0,28	5,9	17,70	200,9	608,08	
13	661,81	—0,3	5,55	17,64	218,54	601,37	
14	651,22	—0,315	5.2	16,82	235,36	621,00	
15	640,09	—0,33	5,0	15,99	251,35	642,55	
16	628,44	—0,34	4,8	14,98	266,33	673,63	
17	616,43	—0,35	4,55	15,26	281,59	649,10	
18	604,07	—0,365	4,2	14,71	296,3	659,91	
19	591,18	—0,38	3,8	13,81	310,11	688,67	
20	577,76	—0,39	3,6	12,69	322,8	732,91	
21	563,99	—0,395	3,4	12,25	335,05	741,21	
22	550,04	—0,405	3,2	11,80	346,85	750,98	
23	535,73	—0,415	3,0	11,33	358,18	762,62	
24	521,08	—0,42	2,8	10,83	369,01	776,46	$t_{вир} = 24$ с

Key: 1. No of step; 2. Comment; 3. Initial conditions

The trajectory of a nonsustained turn is plotted using the V. P. Vetchinkin method, with values of V-i, delta-phi-i, phi-i, and r-xi calculated at each integration step. For this, note on the diagram the zero point (position of the aircraft's center of gravity at the starting moment) and velocity vector V-o. The magnitude of the radius, calculated for the first step, is laid out at point 0 at a right angle to the trajectory. Trace an arc of radius r-z1 from center 0-1, subtending angle delta-phi-1. A trajectory arc for subsequent integration steps is plotted in like manner (see diagram on following page).

There are specific features to modeling vertical maneuvers. For example, it is convenient to state change in G force p-y, as the aircraft operating manual recommends, in the form of relationship of magnitude of trajectory angle of inclination n-y = f (Theta) (Figure 4). Change in G force n-x at each equation integration step, however, can be determined by the following relations:

$$q = \varrho V^2/2,\ C_{y\ r.n} = G/qS,\ C_y = C_{y\ r.n}\ n_y,$$
$$C_x = C_{x0} + AC_y^2,\ \ Q_x = C_x qS,\ \ n_x = (P - Q_x)/G.$$

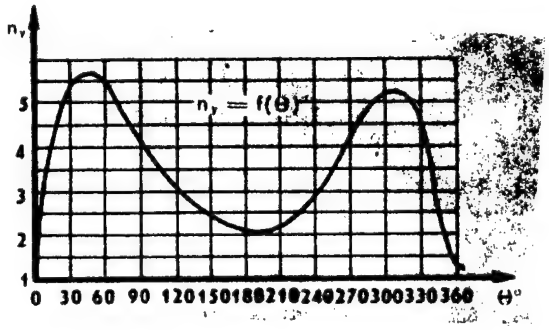


Figure 4.

Engine thrust is determined from its altitude-speed performance characteristics for calculated airspeed and altitude in the specific configuration. For example, Maximum from Theta=0 degrees to Theta=190 degrees and n=80% from Theta=190 degrees to Theta=360 degrees.

Since control function n-y is specified in relation to angle Theta, it is better to integrate an equation of motion of aircraft center of gravity in the following form:

a, p. 37

БОЕВОЕ МАНЕВРИРОВАНИЕ С ПМК

См. статью в этом номере журнала

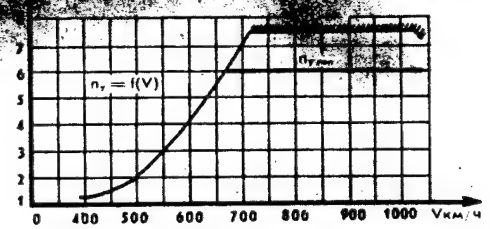


Рис. 1

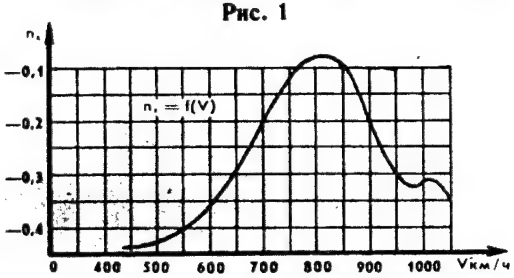


Рис. 2

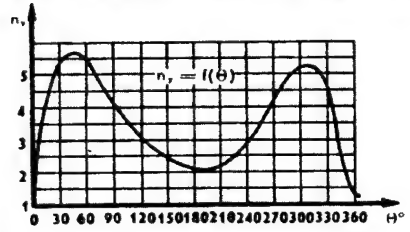


Рис. 3

Figure 5 contains a diagram of a solution algorithm for this problem.

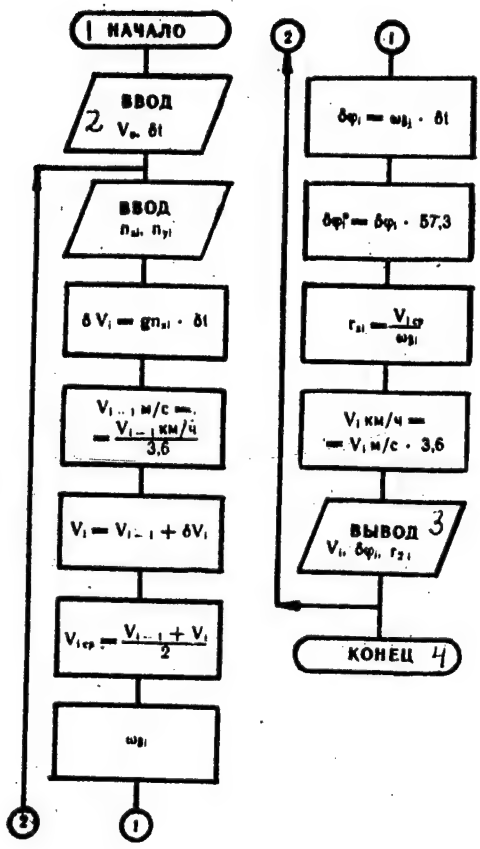


Рис. 1

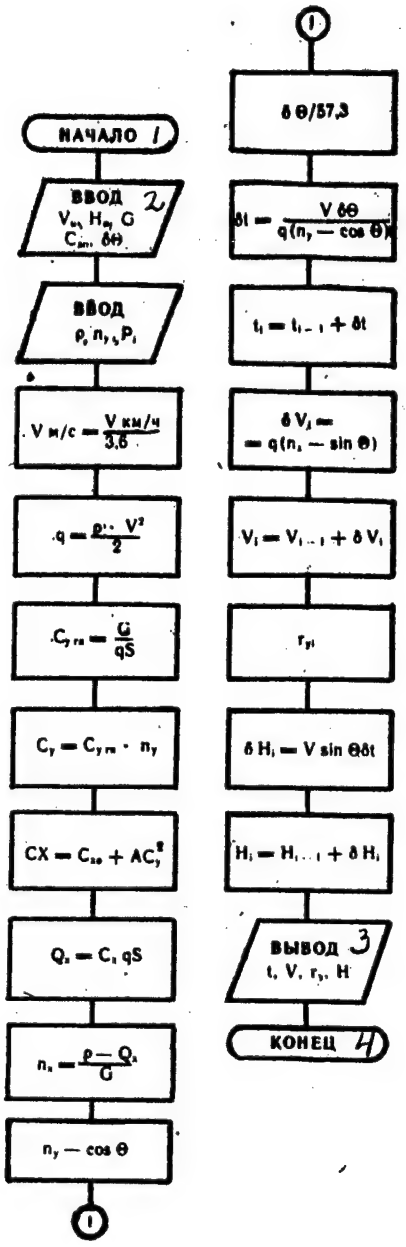


Рис. 2

Figure 5.

Key: See Key to Figure 3

The program for determining parameters of aircraft motion in a vertical plane for the PMK will be as follows:

00.ИП0
01.3 02.· 03.6 04.÷ 05.П8 06.ИП2 07.↔
08.FX² 09.× 10.2 11.3 12.× 13.2 14.÷
15. ПД 16.F1/X 17.ИП1 18.× 19.ИП3
20.× 21.FX² 22.0 23.· 24.2 25.5 26.× 27.
ИП6 28.+ 29.ИПД 30.× 31.ИП7 32.↔
33.— 34.ИП1 35.÷ 36.ПД 37.ИП3 38.
ИПС 39.Fcos 40.— 41.9 42.· 43.8 44.1
45.× 46.F1/X 47.ИП8 48.× 49.ИПС
50.5 51.7 52.· 53.3 54.÷ 55.ПА 56.×
57.П4 58.ИП5 59.+ 60.П5 61.ИПД 62.ИПС
63.Fsin 64.— 65.9 66.· 67.8 68.1 69.×
70.ИП4 71.× 72.ИП8 73.+ 74.3 75.·
76.6 77.× 78.П0 79.ИП4 80.ИПА 81.÷
82.ИП8 83.× 84.П9 85.ИПС 86.Fsin
87.ИП8 88.× 89.ИП4 90.× 91.ИПВ
92.+ 93.ПВ 94.ИП0 95.С/П.

Program instructions:

1. F PRG; enter program; F-AVT; toggle R-G to G.
2. Load Vo (km/h) into P0 register; G (kg) into P1 register; Skho into P6 register; No into PB register; delta Theta into PC register.
3. Load xi into P2 register; n-yi into P3 register; Pi into P7 register.
4. V/O; S/P. Computing time approximately 30 seconds.

Computation results are located: Vi in X and P0 registers; t-i in P5 register; r-yi in P9 register; Hi in PB register.

5. For computation of parameters of aircraft motion in following step, jump to 3.

Note: for program steps 10 and 11, wing area value S=23 sq m is entered, and for steps 22-25 -- coefficient of inductance A=0.25 (figures for the MiG-21 aircraft). For another aircraft S and A may occupy a greater number of applications program RAM locations, and therefore the instructions may be displaced in relation to the addresses of the instructions given in the above program, with the same sequence. For example, if S=32.7, this quantity will occupy addresses 10-13, and the subsequent "X" instruction will be located at address 14.

Example. Determine the parameters of a loop for various trajectory inclination angles with step delta-Theta=15 degrees. Initial conditions: Vo=950 km/h; Ho=1500 m; Theta-o = 0; G=8000 kg. According to the program instructions, we load Vo=950 km/h into the P0 register; G=8000 kg into the P1 register; C-kho=0.017 into the P6 register; Ho=1500 m into the PB register; delta-Theta=15 into the PC register. We then enter variable parameters at each integration step: rho-i into the P2 register; n-yi into the P3 register; Pi into the P7 register; rho-i is determined according to flight altitude from a standard atmosphere table; n-yi -- from a change curve n-y = f (Theta) for the current value of Theta (Figure 4); Pi -- from airspeed and altitude values from engine altitude and speed performance characteristics.

For the above example we have: Step 1: Theta-1 = 15 degrees. Variable parameters: rho-1 = 0.108 kg.sq s/m to the fourth power; n-y1 = 3.8; P1=6800 kg.

Results: V1=956.4 km/h; t-1 = 2.48 s; r-y1 = 2504 m; H1=1669.3 m.

Step 2: Theta-2 = 30 degrees. rho-2=0.106 kg. sq s/m to the fourth power; n-y2 = 5.2; P2=6770 kg.

Results: V2=943.2 km/h; t2=4.15 s; r-y2 = 1699 m; H2=1784.8 m.

Step 3: Theta-3 = 45 degrees. x3=0.1048; n-y3 = 5.7; P3=6700 kg.

Results: V3=923.2 km/h; t-3 = 5.63; r-y3 = 1478 m; H3=1885 m, etc.

Experience in simulation modeling to date enables one to create reliable models of the most complex elements of a flight and to amass a data bank of mission assignment models for performance of maneuvers with various control functions (values P, n-y). This helps flight personnel improve air combat proficiency, master new aircraft rapidly and with excellent quality, and improve flight safety and combat readiness.

3024
CSO: 9144/044

HELICOPTERS IN COMBAT IN AFGHANISTAN

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 87 (signed to press 4 Jan 87) pp 40-41

[Article, published under the heading "They Were Decorated by the Homeland," by Maj G. Karpenko: "According to the Laws of the Flying Fraternity"; first paragraph is AVIATSIYA I KOSMONAVTIKA introduction]

[Text] Military Pilot 1st Class officer A. Volchkov flew more than 600 missions in Afghanistan. His selfless military labor has been honored with award of the Order of the Red Banner, Order of the Red Star, and Order for Service to the Homeland in the Armed Forces of the USSR, 3rd Class. Upon his return from the DRA, Anatoliy Fedorovich was promoted to the rank of colonel and was promoted to a higher position.

"The first thing I noticed when I arrived in Afghanistan to serve with the limited Soviet forces," recalled Anatoliy Fedorovich, "was a poverty which we are unaccustomed to seeing. It was so sad seeing these half-naked children dressed in tatters. I wanted to do everything I could to help these people bring the bloodshed to an end and break loose from the shackles of backwardness."

Officer Volchkov did a lot of flying. The skies of Afghanistan put him to a thorough test of professinal and moral maturity. He had to live and work at a rigid, tough pace and perform difficult, critical missions.

...An Afghan Army subunit was engaged in unequal combat in the mountains, surrounded by a dushman [Afghan rebel] band. They were running out of ammunition. Many of the men were wounded. They needed immediate assistance.

Soon an element of Soviet helicopters took off, loaded with all necessary supplies. It was absolutely essential that they reach the destination. Air cover for the transport helicopters was flown by a 2-ship element led by A. Volchkov, positioned below the formation of supply-laden craft and diverting the bandits' attention.

As soon as the group of helicopters had traversed the pass and were above the gorge, machineguns opened up from the mountain slopes. The wingman's helicopter took several holes in critical places, and the element leader

ordered the pilot to return to base. The leader was now alone. He skillfully maneuvered, and his helicopter neutralized several dushman weapon positions with well-placed fire.

On the next pass a burst of machinegun fire holed the fuselage. One engine stopped, and flames erupted. Unit 1 of the fire extinguishing system automatically cut in. Volchkov manually switched on unit 2. He succeeded in temporarily extinguishing the flames. These few seconds were sufficient for the veteran pilot to choose a landing site and put down. After landing, the crew set up a perimeter defense and prepared to fight off an attack. They heard shots from the mountains above them. Bullets whistled over the crewmen's heads.

After this things happened as if in a fairy-tale. A helicopter suddenly appeared over the mountains, coming in for a landing at high speed. As soon as its wheels touched down, Volchkov ordered his crew to climb aboard into the cargo space. He was the last to clamber through the open door. He recognized the pilot as one of his pupils -- an Afghan pilot to whom he had recently passed on knowledge and flying skills and whom he had taught to land a helicopter in mountain terrain. And now the Afghan airmen, adhering to the rules of the flying community, had displayed courage and selflessness in rescuing their comrades.

Anatoliy Fedorovich maintains that flying skills are more rapidly honed in the skies of Afghanistan. At first things did not run entirely smoothly for Capt A. Cherepanov. Volchkov took this officer on as a member of his crew and meticulously passed on to the latter his own experience and know-how. Cherepanov worked hard to gain thorough knowledge of the equipment and master flying techniques. His psychological toughness also improved. Today he is an expert at his job. He has been awarded the Order of the Red Star for displayed boldness and courage.

Sr Lt V. Leonov also frequently flew with officer Volchkov. Once the helicopter crews, at the request of their Afghan comrades, were to deliver food and medical supplies to a certain location.

"Recollection of that flight brings back the color yellow," recalled Anatoliy Fedorovich. "The entire sky overhead seemed filled with the sun's incandescent disk, with scorched foothills below us...."

None of the crew members noticed any muzzle flashes, but suddenly they were engulfed in a hail of bullets. The controls jammed, and the craft began to plunge groundward. The situation was critical. Sr Lt V. Leonov quickly spotted a bullet hole and extracted a bullet which had lodged in the control rods. The helicopter regained its controllability, and Volchkov pulled it up into level flight. The crew was able to accomplish its mission.

Back on the ground one of his fellow soldiers exclaimed: "Talk about sheer luck!"

But Anatoliy Fedorovich retorted: "It is not a matter of luck but rather the skill and composure of my assistant. He did not become flustered at a critical moment."

Assembling the crew, the commanding officer warmly commended Senior Lieutenant Leonov for his resourcefulness in combat.

Helicopter crewmen know that the activities of each crew member are entirely dependent on the aircraft commander. His will, stick-to-itiveness, and tenacity bind the men together with invisible threads into an integral whole. Personal responsibility for maintaining his crew's combat readiness and for indoctrinating his men in a spirit of devotion to patriotic and internationalist duty make it incumbent that in a critical situation he make well-thought-out decisions, rigorously weighing the pros and cons and thoroughly checking out the solution, and that he himself display the finest qualities and encourage initiative and boldness in his men. Anatoliy Fedorovich continues to adhere to these rules after returning to his old unit.

...At a recent tactical air exercise, which was held in an environment maximally approaching actual combat, scenario instructions were given: the helicopter subunit was to fly a strike on newly-detected ground targets. This required approaching the target undetected under difficult conditions and attacking it coming off a complicated maneuver. A difficult task.

Anatoliy Fedorovich had made thorough calculations of the most unforeseen situations during his study at the Military Air Academy imeni Yu. A. Gagarin. In addition, he had mastered tactics not only from textbooks. He had occasion to employ various tactics on numerous occasions in the searing skies over Afghanistan. The pilots in the subunit were aware of this and waited to see what their commanding officer would say.

Volchkov drew a diagram on the board and explained the input data.

"This tactic here can ensure the element of surprise," he said. "But flawless flying technique will be required."

Flight personnel proceeded with their calculations. They prepared quickly, but thoroughly. At the pre-mission run-through the commanding officer placed equal demands on the veterans and on the younger airmen. They all demonstrated good knowledge.

The crews successfully executed the mission.

Helicopter crew combat training is at full intensity. Vigorously participating in socialist competition under the slogan "We shall implement the decisions of the 27th CPSU Congress and mark the occasion of the 70th anniversary of the Great October Revolution with selfless military labor!," they are filled with resolve to achieve excellent results in combat training.

3024
CSO: 9144/044

UTILITY OF TURN AND BANK INDICATOR STRESSED

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 87 (signed to press 4 Jan 87) p 41

[Article, published under the heading "The Reader Suggests," by Capt (Res) Yu. Uralev: "Remembering the Electric Turn and Bank Indicator"]

[Text] The EUP [electric turn and bank indicator] (a simple, reliable indicator of aircraft turn on vertical axis Y) is perceived by the majority of today's pilots as an obsolete artificial horizon with incorrect, delayed and unstable degree of bank readings, and in addition ineffective at high speeds.

The EUP looks like a very modest instrument indeed in comparison with today's instruments. Nevertheless it might some day prove to be the only means of bringing an aircraft out of an unknown attitude, even inverted, into a normal, wings-level attitude.

Analysis of the operating principle of the EUP-53 indicates that this instrument is inertialess and that every deflection of its needle precisely reflects the aircraft's oscillation on the Y axis; buffeting rocks the aircraft, but not the instrument. The airspeed number 500 on the face of the instrument for the banked turn for which it is calculated is what suggests the idea that readings are incorrect. At all other speeds it indeed either underindicates or overindicates bank angles. Results of calculations brought the author to an empirical formula which reflects the relationship between EUP-53 readings and airspeed of the actual banked turn: beta-s = gamma 500/V-ist or gamma = beta-s V-ist/500 (where beta-s is the EUP-53 needle deflection angle, gamma -- actual bank angle), that is, by how much the aircraft's speed is greater (less) than 500 km/hr, by that much the actual bank angle is greater (less) than the EUP-53 reading. At a speed of 1,000 km/h, for example, readings are half the actual bank angle, and at a speed of 750 km/h -- less by a factor of 1.5. This formula can be used in place of correct tables, which need to be revised, for example, for the An-24 and Tu-154.

At high airspeeds close to maximum, EUP readings are small, and therefore it might seem that the instrument is ineffective. But if one clearly realizes that a small needle deflection can indicate a large bank angle and that zero on a properly-working EUP can indicate zero bank (with the ball centered), one can confidently bring the aircraft to wings level from a situation with total

loss of knowledge of aircraft attitude, bypassing the stage of restoring spatial orientation, which takes time when time is of essence. I have observed dozens of aircraft recoveries from an unknown attitude deliberately set up without warning on novice pilots under the hood on a MiG-15 trainer, and inverted on every occasion. Within a few seconds the aircraft would smoothly be returned to level flight based on EUP and vertical velocity indicator readings. It would later be ascertained that the pilots had not been aware in the slightest that they had been in inverted flight (load factor +1).

The instrument accurately indicates direction of turn regardless of airspeed. It is just that needle deflection will be less at high airspeeds. It is apparently for this reason that the EUP is considered an ineffective indicator of angle of bank. In any case needle deflection, regardless of amount, provides information on direction of turn, rate of turn in excess of 4 degrees per second, and clearly indicates the direction of attitude recovery, which promotes promptly reaching the correct decision.

In contrast to bringing aircraft wings level with the artificial horizon, when the pilot can use just the ailerons, bringing the aircraft level with EUP readings requires coordinated movements of the controls while monitoring the slip indicator (ball). This is due to the fact that reducing angle of bank disrupts the correlation between angular velocity and bank angle: the angle of bank decreases more rapidly than angular velocity, and the more vigorously the aircraft is brought wings level, the greater the difference. And when the actual angle of bank is zero, the aircraft still has an angular velocity, which is indicated by the EUP, while the pilot continues to bring the aircraft out of a now-nonexistent bank and ends up in another bank. This is a result of uncoordinated actions, and the impression is that EUP readings are delayed.

The following question may arise: is a pilot in inverted flight capable of bringing the aircraft wings level inverted? Experience and analysis indicate that, manipulating the controls as customary opposite to the EUP reading, the pilot turns his aircraft unerringly from inverted flight and through a 90 degree angle of bank, at which needle deflection will be maximum, to a head-up wings-level attitude. There is no danger of mistakenly recovering to an inverted-flight attitude, since this attitude is highly unstable. There is another danger: in anticipation of decrease in EUP readings on recovery from an unknown attitude, upon seeing an increase in readings (at a 90 degree bank angle), one might doubt the correctness of the EUP readings or of one's own actions and become destracted with searching for other means of reestablishing spatial orientation. The pilot should patiently wait for zero with deflected controls, and then move the controls to neutral position, even abruptly. The aircraft will stop turning in an attitude without or almost without bank.

If there is doubt as to whether the EUP is operating correctly, this can be tested in exactly one second -- it suffices to press the edge of the instrument panel. In any aircraft attitude in the air or standing on the flight line, an operating EUP will respond with its inherent sensitivity. A nonworking instrument will not react; the needle remains centered.

It has been the aim of the author of these remarks to draw the attention of flight personnel and instrument designers to the fact that the EUP has not outlived its usefulness. In a difficult situation it may prove to be the only remaining gyro-driven instrument which can help the pilot recover to a normal wings-level attitude. It is another matter that it should be brought into conformity with modern ergonomic requirements, and it should be improved from the standpoint of graphic representation as a backup instrument.

It is essential that instructors teach pilots to fly the aircraft on EUP readings in combination with other instruments: vertical velocity or rate-of-climb indicator, altimeter, and airspeed indicator. Designers of cockpit simulators should devote attention toward expanding their instrumentation capabilities pertaining to roll -- up to execution of complete barrel and aileron rolls, with increase in pitch capabilities to vertical climb, and airspeed capabilities to supersonic with loss of controllability, so that the pilot can recover from an unknown attitude with his backup instruments (EUP and rate-of-climb indicator).

In concluding this discussion of the EUP, I should like to state that some pilots, for example, are unable to say without pausing to think about it exactly what the EUP (ball, needle) will indicate in a maneuver involving a slip with a high wing angle, which is used on light aircraft to make landing approach path corrections. This subject always generates debate, since there is no clear understanding of its operation. One can and should believe the readings of the EUP. Actual practice in the air is essential in order to use this instrument skillfully. The electric turn and bank indicator should be present on the instrument panel of new-generation aircraft.

3024
CSO: 9144/044

KIZIM DESCRIBES MIR SPACE STATION EVA

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 87 (signed to press 4 Jan 87) pp 42-44

[Article, published under the heading "Notes of a Cosmonaut," by Twice Hero of the Soviet Union Pilot-Cosmonaut USSR Col L. Kizim: "Third Launch"; part two of two-part article (see No 1, 1987)]

[Text] Greenhouse in Space

For two decades now the problem of developing a self-contained closed-cycle life-support system has been addressed in experimental research plans, because in the not too distant future there will be manned missions lasting a year or 18 months, including Mars missions. In the latter instance you cannot simply send a supply craft out to the cosmonauts. An interplanetary expeditionary craft should contain something in the order of a terrestrial biosphere designed to operate at least 3 years.

K. E. Tsiolkovskiy dreamed of creating in the vacuum of space a garden with sun, rain, and oxygen -- everything without which we could not conceive of life on Earth. Outstanding Soviet writer Aleksanr Belyayev was one of the first to popularize this idea. The magazine VOKRUG SVETA [Around the World] helped acquaint the public with these two interesting individuals. When the novel "Vozdushnyy Korabl'" [Airship] appeared in this magazine in 1934, Tsiolkovskiy wrote a letter to the editors in which he expressed genuine gratitude for this interesting piece and requested that Belyayev send him COD another novel -- "Pryzhok v Nichto" [Leap Into the Void]. A firm, productive friendship began between the founder of space science and the science fiction writer. Konstantin Eduardovich gave advice to Aleksandr Romanovich and suggested ideas. And after the scientist died, the writer named his novel "Vtoraya Luna" [Second Moon], which he had begun while Tsiolkovskiy was still alive, "Zvezda KETs" [Star KETs] in honor of Tsiolkovskiy. This novel popularizes the idea of our great fellow countryman on creating a greenhouse in space.

Today this idea is being seriously examined by scientists at the Institute of Biophysics of the Siberian Department of the USSR Academy of Sciences. Selection and growing of plants capable of recreating an artificial ecological system is being performed in the "fields" of the terrestrial "Bios" complex,

of which there have been three versions. I should note that this is one of the most critical problems we face. The advance of space research has overturned our notions about man's capabilities.

Farming is an ancient occupation. Only animal husbandry can compete with it in terms of length of history. We have learned to refine metals and produce semiconductors in space, we have learned to dock spacecraft and assemble truss beams, but we are unable to grow grain and potatoes, without which it is difficult to conceive of our terrestrial diet.

This paradox will not seem strange if we consider the history of manned space flight. It attests to the fact that even the majority of specially-selected individuals have felt discomfort in space. But apparently selection alone is not enough for plants, which are less adapted to living in new conditions. What is needed is extensive scientific research aimed at creating special varieties of grains and vegetables which, in addition to nutritiousness and high yield, must meet general requirements on conditions of growing and possess the ability to reproduce as well as genetic stability.

No less important is the question of light regimen and "soils" for space-grown plants. On Earth plants live in a customary rhythm of alternating day and night. But what will happen if plants are deprived of nighttime recuperative rest? Will they be able to stand up under the stress? Will they be able to bear fruit? Experiments have produced affirmative replies to these questions. What if illumination is increased? Scientists have established that there is no direct relationship between size of harvest and power of "sun." For example, scientists were able only to double crop size by increasing illumination fourfold over natural light. I say "only" as a professional cosmonaut. For earthlings this is a substantial increase, while for us it means first and foremost a savings in crop-growing area which, as we know, is limited at present.

I am speaking about this for one reason: cosmonauts are not the only ones conducting experiments in space. They are merely the continuers of the hard, productive labor of many, at times little-known workers. In addition, this is one example of how results of research in the area of space exploration can be directly utilized on Earth.

As for biological experiments in space, initially they brought more disappointments than joy. For example, peas planted on Salyut 4 failed to sprout. And of course weightlessness was immediately "blamed" for this, because weightlessness is the principal culprit in the forming of stagnant zones in the root system of plants. "Soil" air, losing oxygen and accumulating carbon dioxide, initially leads to retardation of development, and subsequently becomes a poison to plants.

But everything was much simpler then: the process of photosynthesis was weak. And when illumination of the space "field" was increased with a second planting, the peas sprouted well. The same thing was observed with onions. Attention was also drawn to the fact that certain gases given off by man and polymeric materials can be toxic to plants. For this reason plants began to

be grown isolated from the space station atmosphere, and special filters were used to purify the air.

Considerable prospects in this regard are opening up in connection with the possibility of establishing a space greenhouse in one of the modules of the Mir space station. While in the past conditions close to ideal were created in the system's "phytotrons," in the future scientists and cosmonauts will obtain a simpler and more reliable means of growing higher-order plants in orbit.

The first investigations in the search for a solid soil, for example, have been conducted by cosmonauts and scientists. Vladimir Solovyev and I worked on this on our last mission. What did these investigations involve? Requirements regarding simplicity of technology impelled scientists to reject hydroponic and aeroponic methods of growing plants. A "soil" based on ion-exchange resins was developed. It can be in the form of granules, threads, and a loose-woven fabric, on the surface of which nutrients are adsorbed. Care of the growing crop is reduced merely to watering it. As we know, in weightlessness water can collect into globules and float about in a phytotron. For this reason methods of irrigation were developed which are independent of gravity. Liquid travels along capillary systems like along a wick.

I should note that the first seeds in space were produced by A. Berezovoy and V. Lebedev. These were seeds of a simple sand-loving weed plant -- arabidopsis. Some of the seeds sprouted when planted, but then their life cycle came to an abrupt end. Why? Volodya and I were tasked with studying the cell growth dynamics of arabidopsis grown on solid nutrient media. We began the experiment on Salyut 7, and subsequently part of the equipment was transferred to the Mir, where we continued our investigations. What can I say about results? Analysis of the obtained data indicates an increase in intensity of cell activity, and one can hope that we shall succeed in the near future in accomplishing reproduction of higher plants.

Now a few words about the emotional aspect of biological experiments. City dwellers do not feel the change of seasons as acutely as country people. Not only spring arrives with the first grass but also an emotional surge in anticipation of imminent field work. Planting seeds in a space garden which subsequently becomes the object of touching concern on the part of crew members probably generates as much or even greater emotional response on the part of cosmonauts. It is difficult to convey the joy felt by everyone who has tried growing his own green onions in a tiny "onion bed" in place of purchasing onions trucked in from elsewhere.

"Beacon" Experiment

In 1961 S. Korolev wrote in PRAVDA that there would appear in the near future orbital stations on board which cosmonauts would be able to conduct research and observe the Earth, atmospheric phenomena, and deep space. This ingenious design engineer's prediction has long since come to pass; the ideas he expounded are living and evolving. Today we have come to the practical business of assembling structures in orbit. But the thoughts of scientists and designers proceed further. They are devising plans to build large

structures in space. These might include, for example, power generating stations capable of providing electric power not only for industry in space but also for certain areas on Earth.

Naturally construction of large structures should be preceded by a stage of testing and perfecting design solutions. The "Beacon" experiment also served this purpose. We began preparations for this experiment prior to going into space. Many sought to reassure us at the time, stating that we had plenty of experience working in an EVA environment.

Perhaps we did have more experience than others. But I have never forgotten one of the fundamental conclusions I reached after many years in aviation: as a rule it is not the young pilots but rather the self-confident veterans who violate flight safety rules and regulations. For this reason we took advantage of every single opportunity to increase our knowledge and reinforce skills. Another fact is worth mentioning. If an instructor sees committed interest in a pupil, he endeavors to give him not only that specified by the instruction curriculum but also everything he himself knows. This was the case with N. Yuzov, V. Kalyasnikov, and others.

Preparation for EVA work activities includes two phases. During the first phase the cosmonaut learns to ready the EVA suit and the airlock system. The spacesuits in which we would be working had been upgraded and improved. V. Dzhanibekov and V. Savinykh were the first to test them and gave them high marks. I am now able to confirm that they are more comfortable and allow freer movement. It was also pleasant to note that the desighners had followed our recommendations and provided the pressurized helmets with electric lamps. But nevertheless the spacesuits were new to us, and we went through the prescribed course of training.

It is a pity that journalists do not devote attention to this part of training. This is an important, interesting subject. It is precisely at this stage that the cosmonaut is given the greatest opportunity to sense the "breathing" of space. It is with gratitude that I recall today those methods experts, doctors, scuba divers and other specialists who share together with the designers full responsibility for this phase of training.

EVA activities involve considerable risk and, in order that there be no illusions in this regard, training sessions are conducted in close to actual conditions. In the altitude chamber, for example, where pressure is reduced to 10 to the minus 2 power atmospheres (an altitude of 50-80 km), the cosmonaut not only practices procedures for controlling the heat regulation, ventilation, and oxygen feed systems in the spacesuit but also prepares himself psychologically and gains confidence -- for he senses the hazard involved when he is in this miniature space vehicle. Training ends with a comprehensive practice session, in which various emergency situations are played out.

EVA activities are rehearsed in the second phase. Training sessions are held in the weightlessness simulation tank, which also has its peculiarities. When working at a depth of more than 10 meters, a person must ascend to the surface following a specific time schedule, for otherwise he could get the bends.

Since these training sessions are held in the concluding phase of training, the doctors entertain doubts about the cosmonaut's health just prior to mission departure. I am not talking about the stress loads one endures when spending 5-6 hours at a time underwater wearing a 250-kilogram suit. After such a training session the crew remains all day at the Cosmonaut Training Center. If the doctors detect excessive nitrogen content in the blood, a purging-out procedure must be performed. Actual EVA is preceded by difficult, hazardous work activities on the ground.

On 28 May 1986 Volodya and I were scheduled to do an EVA on Salyut 7 for the seventh time. On the eve of the scheduled EVA we prepared and tested the spacesuits, transferred from Kosmos 1686 into the transfer module of the Salyut 7 the truss beam deployment and folddown unit (URS) -- folded together and packed into a 1.5 meter "barrel" in the form of a concertina-pleated hinged-grillwork structure with mechanisms, payload platform and spaceborne optical communications system (BOSS) unit with cable and connectors.

At 0843 hours we opened the hatch and placed the safety ring on it. We cleared the work area prior to proceeding with the "Beacon" experiment: we took down and moved into the transfer module the instruments which we and V. Dzhanibekov's crew had set out on the previous mission. We then mounted the payload platform on the safety handrails. It became the "foundation" to which we would be securing the URS and the microstrain unit.

First we set up the truss beam deployment device. This unit, developed at the Electric Welding Institute imenu Ye. O. Paton, provides truss beam positioning and deployment in automatic, semiautomatic, and manual modes. In any configuration the process provided gradual truss beam deployment on a stepped basis, 50 centimeters at a time. The fact is that we were not only to test the operational feasibility of the structural components in the actual space environment but also to determine the dynamic characteristics of the truss beam erection unit-orbital complex combination and their effect on space station control.

Volodya took up position at the control panel, while I manned the standby control in case the automatic control system failed to work. We deployed the 12-meter truss beam with the beacon at its tip slightly behind schedule. We then removed a light from the transfer module, aimed it at the beacon, switched the light on (we were in shadow), and took photographs.

Such truss beams can become not only a standardized building material, as previously discussed, but also a means of transportation. Equipped with remote control, they will make it possible to deliver operator personnel, tools and various equipment virtually to any point on the station from the hatch area. It can be employed in installation activities, such as in enlarging solar panels. And a truss beam deployed alongside the station can serve as a passage ramp for several persons. Large numbers of various instruments could also be mounted on it for conduct of space research.

Proceeding with the EVA schedule, we then began mounting the spaceborne optical communications system (BOSS). Its operating principle consists in the following. Electrical signals are fed from data sensors along communications

channels to a transmitter. Here they are converted to digital form, encoded, and transmitted to a receiver by a single "wire," which actually is a low-power laser beam. These communications can be run through a viewing port, without breaking the integrity of the station hull. Passing through the glass, the laser beam is converted in the receiver into electrical signals, which are transmitted to Earth in digital form or recorded on a spaceborne recording device.

We had set up the receiver in advance, but now we had to "walk" practically across the entire station with the transmitter and cable. Its installation coincided with the second entry by the orbital complex into the Earth's shadow. But we were fairly experienced, and by "dawn" had not only mounted the transmitter but had also swung the truss beam back in on semiautomatic mode.

Our first EVA on this mission came to an end. It had run 3 hours 50 minutes. Two days later we went out again to continue the experiment we had begun. As on the first EVA, we once again deployed the truss beam. I climbed up it to a "height" of 10 meters in order to mount the instrumentation for the "Fon" [background] experiment to study the atmosphere around the orbital complex. The BOSS recorded truss beam oscillations and information on the atmosphere.

First Volodya and then I sequentially performed welding of several truss beam components. The multipurpose manual tool had been improved: the metal vaporization crucible had been replaced with a second electron beam gun. In my opinion such a tool should become a regular station equipment item and be kept outside the station in order not to waste time on transferring it. Following these research investigations the truss beam deployment unit was taken down and removed. We mounted in its place a microdeformation unit -- a device to test structural materials under various cyclic stress loads. Information is fed from this unit via BOSS into the station. As our final EVA task we removed from the solar panel a specimen placed there by V. Dzhanibekov and V. Savinykh, to be delivered to specialist personnel. Our second EVA ran 5 hours.

Today, when I recall that mission, I cannot help but think about the development of technology which the Americans talk about in justifying their SDI program. I simply cannot understand them. Much greater opportunities for development of this technology can be provided by programs like the one Vladimir Solovyev and I carried out.

3024
CSO: 9144/044

USING SATELLITES FOR GEODETIC MEASUREMENTS

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 87 (signed to press 4 Jan 87) pp 44-45

[Article, published under the heading "The Space Program Serving Science and the Economy," by G. Glabay: "Space Geodesy"]

[Text] The history of civilization persuasively demonstrates man's constant striving to grasp the substance of the phenomena of the world around him and to utilize the obtained results in his own practical activities.

This was also the case following the launching of the first satellites. These satellites indicated strange behavior by space vehicles in orbit. A satellite would rise, dip, and displace to the left or right. Why was this?

Today we can answer this question. The Earth exerts the predominant influence on the orbit of a space vehicle. The Earth is not a rigidly solid object. The Earth's surface is constantly changing under the effect of external and internal forces. The moon and our planet's internal processes, for example, cause periodic tides in the Earth's crust. There occurs redistribution of masses, which leads to the shifting of landmasses and change in the position of the Earth's axis and its speed of rotation. Thus the Earth's geometry and physics change with time. And this affects the coordinates of known points and geophysical constants which are utilized both in science and in many branches of the economy.

Study, refinement and detailing of the shape of the Earth is a task performed by one of the most ancient sciences -- geodesy, the origins of which lie deep in antiquity. The idea that our planet is spherical was first stated by Pythagoras (6th century B.C.), and the Earth's radius was determined three centuries later. The mathematical apparatus which was given the name triangulation method, however, was not devised until the 17th century. It is based on a purely mathematical method of solving triangles and makes it possible accurately to determine the length of arcs of great extent and to create coordinate (geodetic) networks which describe the mutual location of points on the Earth's surface. We should particularly like to note the work done in the 19th century under the guidance of famed Russian astronomers and geodesists K. Tenner and V. Struve: the famous "Struve arc" stretched from the mouth of the Danube to northern Norway, a distance of almost 3,000 kilometers.

This was an unparalleled piece of work. It was used to determine the Earth ellipsoid not only in this country but in many other countries as well. Subsequently the Earth model was continuously refined and detailed, but this work has not yet been concluded.

Continuing to improve and perfect the triangulation method, geodesists came up with the idea of the need to build special beacon towers or scaffolds. They were up to 30 meters in height, and line of sight was extended by 20-30 km. Nevertheless, the failed to solve the problem. Subsequently there was a proposal to use balloons, parachute flares, and illuminating shells. But they too were unable substantially to increase the size of the triangle in comparison with conventional means. Devised methods of observing moving light targets, however, became the foundation on which space geodesy was born. 4 October 1957 can be considered the date of its emergence, since the first photographs of Soviet satellites against the star background were used to solve geodetic problems.

The high orbital altitudes of satellites provided the capability to perform space triangulation with legs of 1,500-2,000 kilometers and more, and this made it possible to tie the Earth's landmasses and islands into a single geodetic netowrk.

Today, utilizing the results of observations of satellites and the Moon, geodesy is engaged in determining and refining the fundamental constants which characterize the Earth's shape, dimensions, and diurnal rotation. It also solves other problems of considerable economic significance, such as a coordinate-time tie-in of results of satellite surveys of the Earth and the planets for purposes of study of natural resources, mapping, geophysics and, in particular, geodynamics.

What are the advantages of the methods employed by space geodesy over conventional, traditional methods? First of all, the capability to obtain solutions faster and with greater accuracy and to use for determining gravitational field parameters a limited number of stations on the Earth's surface instead of a dense network of points on land and on the sea. And the employment of satellite altimetry (measurement of distances to the ocean surface with a radar altimeter) makes it possible to study in detail the shape of the geoid in the oceans and to obtain other geodetic and oceanographic information.

Various space objects can be used for purposes of geodesy, but the most valuable data are provided by specialized satellites. They are subdivided functionally into active (carrying transmitting or relaying equipment) and passive (inflated balloons with a large reflective surface or satellites carrying reflectors to reflect back laser beams). Requirements on such satellites were formulated at a 1964 meeting of the International Committee for Space Research.

Observations of satellites are conducted with the aid of special equipment. Just what is this equipment and what is the history of its development?

We should note that when the first Soviet satellite was launched on 1 October 1957, 66 stations, at which for the most part AT-1 tubes were used, were ready for operation. Organization and coordination of their operation was the responsibility of the USSR Academy of Sciences Astronomical Council. A "Satellite Service" -- a network of special stations which covered practically the entire country -- was established in 1958, pursuant to the International Geophysical Year program.

Increased demands on reliability of measurements made it necessary to shift from visual to photographic observations. Photographs of a satellite's track against a star background, taken by telescope, made it possible to increase the accuracy of observations by three orders of magnitude. Modified aerial photographic cameras produced even better results. Subsequently the AFU-75, FAS, and VAU special satellite cameras were developed. Photographic observations of satellites provided for the first time documentation and the required accuracy of space geodesy, and photographic cameras, in spite of the subsequent development of Doppler and laser measurements, continue to be used successfully for solving geometric and dynamic problems.

The ultimate objective of solving geometric problems is the plotting of geodetic networks encompassing the entire globe. Triangulation continues to be the principal method. Satellite triangulation is based on simultaneous or quasisynchronous observation of a satellite from several points on the Earth's surface. This makes it possible, by solving three-dimensional triangles, using the known position of terrestrial points and measurements taken at this moment (angular, ranging), to compute the coordinates of points of interest to us. In geometric problems a satellite is used as the high-altitude sighting target, whereby it is not essential to know the satellite's precise motion model. On the contrary, in dynamic problems theory of satellite motion is of determining significance.

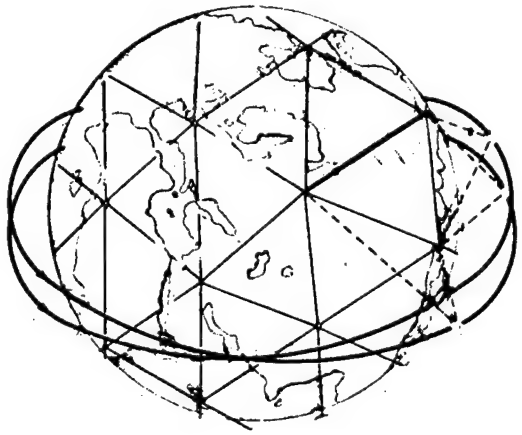


Diagram of plot of satellite triangulation network

The emergence of satellite geodesy brought forth a great many new problems. What could be simpler, it would seem: observe a satellite as a moving sighting

target and determine the location of the geographic points of interest to us. A satellite, however, is a fairly unusual space object, study of the motion of which presents many new problems.

While a well-developed mathematical theory of motion exists for natural celestial bodies moving beyond the limits of the Earth's atmosphere (with all its complexity it provides predictions running tens and hundreds of years into the future), in order to compute the orbit of a satellite (small mass), part of the orbit of which frequently falls within the boundaries of the Earth's atmosphere, one must take into account the atmosphere's braking effect, all irregularities of the terrestrial gravitational field and, for some orbits, also the influence of the Sun, the Moon, and the planets. Therefore predictions of satellite motion can at best be made only for a few days into the future, while continuously making corrections on the basis of observations.

Such observations should cover as large a segment of an orbit as possible and be made from the largest possible number of points located throughout the entire globe, with points not more than 1,000 kilometers distant from one another. Solving dynamic problems makes it possible to refine and detail the parameters of the Earth's gravitational field, its mass and rotation, as well as fundamental geodetic constants.

Satellite geodesy has made it possible to validate aerial topographic surveys in hard-to-reach areas, to tie islands into landmasses, and to determine certain points, in Antarctica, for example, reefs, shoals, and other points, in the interests of the economy. It helps specialists in countries with vast territories to conduct mapping and to interconnect isolated triangulation networks.

The first synchronous observations were made in May 1961 from Pulkovo, Nikolayev, Kharkov, and Tashkent. In 1963 stations in the GDR, Poland, Romania, and Czechoslovakia operated simultaneously with the stations of the USSR Academy of Sciences Astronomical Council network.

A new international joint observation session was set up at the beginning of 1966, with the participation of the USSR, United States, Great Britain, the Netherlands, France, Sweden, and the FRG. Cooperation on the part of the socialist countries within the framework of the Interkosmos program proved particularly fruitful.

In recent years work has been in progress in the USSR and the socialist countries, within the framework of cooperation on carrying out space research programs, on project "Great Chord." Two vector-triangulation legs -- "Arctic-Antarctic" and "East-West" (from Japan to Bolivia) -- will be plotted from the results of photographic and laser satellite observations.

Work has also continued on more accurate measurement of distances to satellites, since orbital "oscillations" reflect the shape of the Earth and its magnetic field. Specialized geodetic satellites carrying corner reflectors were launched into orbit. Interkosmos 17, for example, provided

capability to measure range with an error or 2-3 meters. Laser technology is today providing capability to measure distances with even greater accuracy.

A system of satellite-to-satellite observations provides capability to determine the structure of the Earth's gravitational field. If a geostationary satellite is used as a point from which to track a low-orbit satellite, one can detect orbital changes caused even by local gravitational anomalies. Deviations in the Earth's shape from an ellipsoid have now been determined with the aid of satellite geodesy methods.

We have already noted that results obtained by satellite geodetic methods are useful for solving problems of geodynamics. The accuracy of laser and Doppler satellite measurements attained to date helps in the investigation of tidal phenomena, in studying the movement of lithosphere plates and in formulating earthquake predictions.

Further refinement and detailing of parameters of the Earth's rotation and pole coordinates was worked on in the period 1980-1985 in connection with the international MERIT program. Laser lunar detection and ranging, long-base radiointerferometry, and phase-stable radiointerferometry are highly promising techniques for accomplishing these tasks.

A system of ground and satellite hardware -- a geodetic satellite complex -- has now been developed for the purpose of plotting geodetic systems, refining and detailing the parameters of the terrestrial ellipsoid and the Earth's gravitational field. The system includes space vehicles, ground observation points, command centers, and central facilities for preparing operational programs, collecting and processing information.

Productive integration of results obtained from scientific and technological advances as well as the methods of geodesy, an ancient, basic earth science -- is making it possible to perform complex, precision tasks which seemed impossible 30 years ago, and to produce an current picture of a constantly changing world.

3024
CSO: 9144/044

NASA 'COMMERCIALIZATION OF SPACE' CLAIMED PLOY TO BENEFIT SDI

Moscow AVIATSIYA I KOSMONAVTIKA in Russian No 2, Feb 87 (signed to press 4 Jan 87) pp 46-47

[Article, published under the heading "Imperialism -- Enemy of Peoples," by Ye. Yermakov: "Is It Not For the Benefit of SDI?"; based on materials published in the foreign press]

[Text] Appropriation of funds for the space program has always been a stumbling block in the policy of U.S. presidents, causing various debates and criticism. In his presidential campaign John Kennedy, for example, sharply criticized Dwight Eisenhower for failure adequately to appreciate the role of space exploration. Kennedy in turn was condemned for backing grandiose projects such as a manned mission to Mars. Jimmy Carter was the target of the greatest criticism, however. Some criticized him for excessive space program appropriations, while others on the contrary criticized him for inadequate appropriation of funds for these purposes. Current U.S. President Ronald Reagan, in view of the experience of his predecessors, turned over civilian space program activities to the private sector. This decision sought to kill two birds with one stone: it cut back government expenditures on civilian space programs and increased appropriations for military space programs, which fully satisfied the desires of the U.S. military-industrial complex.

The infusion of private capital into U.S. space programs had been fairly substantial in the past as well, especially in the area of communications. All U.S. civilian satellite communications systems presently in operation or under development belong to private companies and corporations. One exception is the specialized TDRSS system used by the National Aeronautics and Space Administration (NASA). But NASA also leases this from the SPACECOM Corporation.

The proposal to sell applications satellites, announced by Reagan on 4 July 1982, initially met resistance in certain circles. This was due not so much to loss of income earned by the government sector from sale of satellite information as to displeasure on the part of the U.S. Department of Defense. It seems that DOD also made extensive use of information obtained by civilian weather and earth resources satellites. This is why, when LANDSAT remote Earth sensing satellites were turned over to the private sector in November 1985, it was decided to wait with the matter of civilian weather satellites

until the Pentagon expanded its own weather satellite network. The understanding is that future development and launching of new civilian weather and Earth resources satellites will be financed solely by private U.S. companies, which in turn will have access to all data obtained from them.

There was greater favor in the United States toward another aspect of the program of "commercialization of space," pertaining to activities in the area of space materials science. NASA let a contract to prepare estimates on possible income from the commercial manufacture of various materials in space (medicines, semiconductor crystals), and they naturally proved to be quite impressive. NASA is now harvesting its fruits. More than 20 private U.S. firms and corporations have signed agreements with NASA to carry out commercial projects pertaining to the manufacture of materials in space. Similar agreements with 40 large companies are currently pending.

A National Committee on Space was formed in March 1985. In announcing its membership, President Reagan stressed that the new committee, headed by former NASA administrator T. Payne, was charged with accelerating the exploitation of space for commercial purposes by private U.S. companies. The activities of this committee deal mostly with long-range programs, in particular a project for a permanent U.S. orbital space station, development of which would involve the extensive enlistment of private capital. In connection with this the U.S. orbital space station is to include special laboratory modules and space platforms for use by private companies for commercial purposes. These modules and platforms are intended primarily for the commercial manufacture of various materials.

Transfer to the private sector of Delta, Atlas-Centaur and Titan-34D one-shot boosters is an important aspect of the "commercialization of space" program being promoted by the present administration. It appears that eventually launch equipment for these rockets, which at present is leased from time to time by private companies, will also be sold. In addition, the Conestoga booster is presently being developed on a commercial basis in the United States.

This policy is giving rise to serious concern on the part of some U.S. legal agencies, and not only these agencies alone. The absence of proper governmental oversight over private funds and private "commercial payloads" could turn out to be far from harmless to mankind.

It was a natural desire of U.S. private companies to obtain the space shuttle on a commercial basis. Back at the beginning of 1981 a number of firms formed the ESTS Corporation, which proceeded to campaign for transfer of operation of this craft over to the private sector. They were particularly active during the debates on the advisability of building a fifth shuttle craft (in addition to Columbia, Challenger, Discovery, and Atlantis), offering to invest capital on the condition that it be turned over to the private sector after a certain period of time. This proposal is still on the table today, since following the loss of Challenger the decision was made to build a new shuttle craft. Even if the decision is made to build it on a commercial basis, however, it will be many years before the craft will be turned over to the private sector. And the fact is, pursuant to a decision by the Reagan Administration, in the

coming decade the highest priority in using the space shuttle is going to the Pentagon for boosting military payloads into orbit, including payloads connected with the vaunted SDI program.

At the same time the present administration is giving every encouragement for commercial development by the firm Third Millennium of a "Space Van" shuttle craft. Designed for boosting commercial payloads into orbit, it will be unmanned, in contrast to the space shuttle, and will be launched from an aircraft.

We have already discussed plans to develop orbital modules, space tugs and platforms. All these projects are being undertaken on a commercial basis, without any subsidies by NASA, in other words by the public sector. Private companies are hoping to recoup their costs on development of these space infrastructure components by selling them to commercial users or by leasing them to NASA and the Pentagon. One can understand the interest shown by U.S. military agencies in development of such elements of a space infrastructure and at the same time the present administration's favorable attitude toward the development of private unmanned shuttle craft, modules for them, platforms and interorbital tugs.

It is noteworthy that at the present time NASA is taking no part whatsoever in the development of any new civilian space exploitation programs, with the exception of the permanent space station project (on which not more than 2.5 percent of the NASA budget is being spent). This is due on the one hand to the transfer of application programs and developments to the private sector, and on the other hand to a sharp cutback in scientific research activities. It was noted during the discussion in Congress of NASA plans for 1986 that they contained no new programs dealing with scientific exploitation of space. It is true that NASA reacted to criticism in a rather peculiar way at the time, declaring 1986 to be "space science year." The fact is that by that time NASA had amassed a pretty fair backlog of scientific programs from the past decade, which had either been indefinitely postponed or cancelled entirely. Just a few years ago, in order to reduce the NASA budget, the proposal was even made to scrap the Voyager 2 Uranus flyby project, that is, the only U.S. program to produce scientific results in 1986.

The decision to hand over certain NASA functions to the private sector proved to be an important aspect of the program to "commercialize space." We should note that even in the past private U.S. companies on various contracts were engaged not only in the development of space hardware but also involved in operations to service and maintain this hardware. Employees of Ford, for example, had since 1963 been involved in operations pertaining to manned mission control, had developed and installed new devices at mission control in Houston, had repaired and overhauled equipment and conducted astronaut training with space center personnel. Employees of other private companies were involved in operations connected with the assembly of all NASA payloads at launch facilities and worked on servicing expendable booster launches. The program to "commercialize space" sanctioned transfer to the private sector of the majority of operations previously performed by NASA employees and virtually led to the selling off of the principal functions of this organization.

Since NASA itself handled the selling off of its functions, it naturally sought to obtain appropriate benefit from this. Therefore on each occasion a unique competition among private companies would be arranged, in which, in contrast to the customary auction, the principle of low bid applied. That company with the lowest bid would win out. If for any reason NASA felt that it had sold too cheaply, the contract would be torn up and a new competition would be announced. For example, recently NASA decided to reduce expenditures contracted with United Space Boosters, which was handling the manufacture, testing, recovery and rebuild of the space shuttle solid-propellant boosters. The contract was dissolved and a new competition announced. As was to be expected, that same company won out again, but this time at a lower bid.

In 1983 a consortium led by Lockheed won a 2.5 billion-dollarcontract, the largest in the history of NASA. The consortium member companies were to provide for a period of 2-3 years operations connected with launching and recovery of the space shuttle, servicing, maintenance and repair of launch facility ground equipment at Cape Canaveral. Another consortium, headed by Rockwell (which set up a special division), took over from January 1986 on operations pertaining to servicing the space shuttle between missions, readying the craft and its payload for launch, and mission control. Incidentally, this certainly did no harm to Rockwell, which, in addition to all else, is responsible for building the space shuttle and which demanded 5 billion dollars from NASA to build a new shuttle craft and to refurbish existing shuttle craft.

The large size of the contracts let in connection with "commercializing NASA" indeed indicates that the principal functions of this organization are being sold off, although perhaps not without benefit to the NASA budget. However, in spite of carrying out the program to "commercialize space," in particular the profitable sale of NASA's principal functions, its annual budget has not decreased. It would seem that NASA does not have many of these functions left, and if one more low bid competition were announced, this entire organization would be sold off on the auction block. But the fact is that for a number of years now the NASA civilian organization in particular has been in the service of the Pentagon, laboring very fruitfully on Pentagon needs. For example, an examination of the NASA budget for fiscal year 1983, that is, prior to research and development of SDI, by the Office of Management and Budget revealed that 20 percent of the NASA budget was being spent on Pentagon needs. And the space shuttle program itself, by the admission of the president's science adviser (G. Keyupord), is an essential element of SDI.

Now that the United States has begun work on SDI, one must assume that the percentage of the NASA budget going for the Pentagon's needs has increased substantially. This is the purpose, in particular, of a presidential directive instructing NASA, together with the military departments, to submit by the end of 1987 their views on modernizing and upgrading existing space transport systems, as well as on utilization of new space hardware in the SDI program. Pursuant to a formal agreement with the Pentagon, NASA has already assumed part of the costs of development of a military air-space vehicle, which is being assigned an important role in the "Star Wars" program. All this applies only to officially announced projects in which NASA is involved

jointly with the Pentagon, and it is not known what the Office of Management and Budget would uncover if it examined the next fiscal year's NASA budget. A conclusion is suggested in this connection that the entire program to "commercialize space" was conceived not so much to reduce the NASA budget as to free up new funds for a continued arms race in space.

In less than two years the NASA civilian organization will be celebrating its 30th anniversary. And it is appropriate to recall at this point that at the time the government space agency was created, Dwight Eisenhower initially proposed that it be handed over to the Pentagon, but changed this decision under the pressure of public opinion. And now at the threshold of its anniversary NASA, which has been taken over by the U.S. military-industrial complex, once again has lost all traits of a civilian organization. The impression is forming that today's NASA "civilian organization" serves only as a screen to conceal additional expenditures for military purposes at the expense of the U.S. federal budget. And it is extremely desirable for the Administration to conceal these expenditures at the present time, when clear dissatisfaction with the results of the meeting in Reykjavik is being shown in U.S. political and public circles.

3024
CSO: 9144/044 - END -

10

Foreign Broadcast Information Service (FBIS) and Joint Publications Research Service (JPRS) publications contain political, economic, military, and sociological news, commentary, and other information, as well as scientific and technical data and reports. All information has been obtained from foreign radio and television broadcasts, news agency transmissions, newspapers, books, and periodicals. Items generally are processed from the first or best available source; it should not be inferred that they have been disseminated only in the medium, in the language, or to the area indicated. Items from foreign language sources are translated. Those from English-language sources are transcribed, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [ ] are supplied by FBIS/JPRS. Processing indicators such as [Text] or [Excerpts] in the first line of each item indicate how the information was processed from the original. Unfamiliar names which are rendered phonetically or transliterated by FBIS/JPRS are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear from the original source but have been supplied as appropriate to the context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by the source.

SUBSCRIPTION/PROCUREMENT INFORMATION

The FBIS DAILY REPORT contains current news and information and is published Monday through Friday in 8 volumes: China, East Europe, Soviet Union, East Asia, Near East & South Asia, Africa (Sub-Sahara), Latin America, and West Europe. Supplements to the DAILY REPORTs may also be available periodically and will be distributed to regular DAILY REPORT subscribers. JPRS publications generally contain less time-sensitive information and are published periodically. Current JPRS publications are listed in *Government Reports Announcements* issued semi-monthly by the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, Virginia 22161 and the *Monthly Catalog of U.S. Government Publications* issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

U.S. Government offices may obtain subscriptions to the DAILY REPORTs or JPRS publications (hardcovers or microfiche) at no charge through their sponsoring organizations. DOD consumers are required to submit requests through appropriate command validation channels to DIA, RTS-2C, Washington, D.C. 20301. (Telephone: (202) 373-3771, Autovon: 243-3771.) For additional information or assistance, call FBIS, (703) 527-2368, or write to P.O. Box 2604, Washington, D.C. 20013.

The public may subscribe to either hardcover or microfiche versions of the DAILY REPORTs and JPRS publications through NTIS at the above address or by calling (703) 487-4630. Subscription rates will be provided by NTIS upon request. Subscriptions are available outside the United States from NTIS or appointed foreign dealers. Back issues or single copies of the DAILY REPORTs and JPRS publications are not available. New subscribers should expect a 30-day delay in receipt of the first issue.

Both the DAILY REPORTs and the JPRS publications are on file for public reference at the Library of Congress and at many Federal Depository Libraries. Reference copies may also be seen at many public and university libraries throughout the United States.